9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL,J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note: The LCS had recoveries outside the QC limits; however, the LCS is associated with the field blank. Therefore, no qualification of data was required.

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		x	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
13.2	Number of samples:	1			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	7/11/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 003
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Certain analytes were qualified estimated due to surrogate recoveries and duplicate %RPDs.

Field IDs:

AA-P-5-34	AA-P-8-122	AA-P-8-122-D
AA-P-7-72	AA-P-7-92	SA-Q-2-FB
AA-P-6-70	AA-P-6-70-D	AA-P-6-90
AA-P-6-110	AA-SLAY-3-50	AA-SLAY-3-70
AA-SLAY-3-70-D	AA-P-7-110	AA-P-5-54
AA-P-5-74	AA-P-5-94	AA-P-5-114
AA-P-6-30	AA-P-6-50	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the surrogate and MS/MSD recoveries were outside the QC limits.
The narrative also suggested that the CCV had recoveries outside the QC limits; however this is beyond the scope of this review, although it should be noted.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage conditions meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/trip rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 Initial Calibration

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of CFs and %RSDs to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			x

Note:

6.0 Surrogate Recovery (Code S)

				Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?			x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x	
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?				x	
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)				x	
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note: The surrogates were recovered outside the QC limits for sample AA-P-5-94. The following qualification was applied.

Field ID	Analyte	Surrogate Recoveries	Surrogate Limits	Qualification	Code
AA-P-5-94	MCPP	165	70-130	J	S

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: Several analytes were recovered outside the QC limits in the MS/MSD. However the LCS sample recoveries were within QC limits; therefore, no qualification of data was required.

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for Herbicides analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		x	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: The sample AA-P-6-70 and its duplicate had %RPD outside QC limits; the sample is qualified below.

Field ID	Analyte	Qualification	Code
AA-P-6-70	MCPP	J	F
AA-P-6-70-D	MCPP	J	F

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
12.2	Number of samples:	20			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.2 x 12.3) - 12.4) / (12.2 x 12.3)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review
Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	7/12/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS003
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Several analytes were qualified as estimated due to lab duplicate RPDs and MS/MSD recoveries outside QC limits.

Field IDs:

AA-P-5-34	AA-P-6-70	AA-P-6-70-D
AA-P-8-122	AA-P-6-90	AA-P-6-110
AA-P-8-122-D	AA-SLAY-3-50	AA-SLAY-3-70
AA-P-7-72	AA-SLAY-3-70-D	AA-P-7-110
AA-P-7-92	AA-P-5-54	AA-P-5-74
SA-Q-2-FB	AA-P-5-94	AA-P-5-114
AA-P-6-30	AA-P-6-50	

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x										x	
1.4	Does sample preservation, collection and storage meet method requirements? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 °C ± 2 °C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the MS/MSD spike samples had recoveries outside QC limits. Laboratory duplicate RPDs were outside QC limits.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28 days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code C)

						ICP			ICP-MS			GFAA			CVAA-Hg		
						Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)							x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).																x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.							x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.							x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%)							x									x
	Action:		R(+/-)	J(+)/UJ(-)	J(+)	R(+)											
		Mercury	< 65%	65% - 79%	121% - 135%	> 135%											
		Other Metals	< 75%	75% - 89%	111% - 125%	> 125%											

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		x									x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours) and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ±2 X PQL for solids) Action: If no, J(+).		x								x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Sample AA-P-5-34 was spiked. Certain analytes were outside QC limits and are qualified below.

Field ID	Analyte	Qualification	Code
AA-P-5-34	Aluminum	J	K
AA-P-5-34	Iron	J	K
AA-P-5-34	Zinc	J	K

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)		x								x		
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: Several analytes were outside the QC limits. Qualifications due to these analytes are listed below.

Field ID	Analyte	Qualification	Code
AA-P-5-34	Aluminum	J	M
AA-P-5-34	Potassium	J	M
AA-P-5-34	Zinc	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note:

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)	x									x		

Note: Samples AA-SLAY-3-70, AA-P-8-122, and AA-P-6-70 are parent samples for field duplicates AA-SLAY-3-70-D, AA-P-8-122-D, and AA-P-6-70-D.

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)							
13.2	Number of samples:	20		0		0		20
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.2 x 13.3) - 13.4) / (13.2 x 13.3)							
	% Completeness	**100**		####		###		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	7/12/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 003
Test Name:	Ammonia	**Review Level:**	Level III

Method No.:

350.1

Major Anomalies:

No analytes were rejected.

Minor Anomalies:

One sample was qualified based on field blank analysis.

Field IDs:

AA-P-5-34	AA-P-8-122	AA-P-8-122-D
AA-P-7-72	AA-P-7-92	AA-P-7-110
SA-Q-2-FB	AA-P-6-70	AA-P-70-D
AA-P-6-90	AA-P-6-50	AA-P-6-110
AA-SLAY-3-50	AA-SLAY-3-70	AA-SLAY-3-70-D
AA-P-5-54	AA-P-5-74	AA-P-5-94
AA-P-5-114	AA-P-6-30	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?	x		
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: The field blank reported a detection of ammonia at a concentration above the MDL. The following sample is qualified.

Field ID	Analyte	Qualification	Code
AA-P-5-34	Ammonia	U	X

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			x

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: The MS/MSD samples had recoveries below the QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recovery	RPD	MS/MSD/RPD Limits	Qualification	Code
AA-P-5-34	Ammonia	77/77	1	90-110/30	J	M
AA-P-6-70	Ammonia	**22/25**	5	90-110/30	J	M

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted for ammonia analysis?	x		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples AA-SLAY-3-70, AA-P-8-122, and AA-P-6-70 are parent samples for field duplicates AA-SLAY-3-70-D, AA-P-8-122-D, and AA-P-6-70-D.

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	x		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment.		x	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < $\pm$ PQL for aqueous, and RPD < 35% or difference < $\pm$ 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	x		

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
12.2	Number of samples:	20			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/4/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS004
		Review Level:	Level III

Major Anomalies:

Several samples had analytes rejected due to internal standard recoveries.

Minor Anomalies:

Several samples had analytes qualified due to surrogate, LCS, and internal standard recoveries.

Field IDs:

SA-Q-2-SS-0.5	SA-Q-2-SB-4	AT-Q-24-SB-6
AT-Q-24-SS-0.5	AT-Q-26-SB-6	AT-Q-26-SS-1.5'
AT-Q-27-SB-6'	AT-Q-28-SB-6'-DUP	AT-Q-27-SS-1'
AT-Q-28-SB-6'	SA-Q-3-SB-6	AT-Q-28-SS-1.5'
SA-Q-3-SS-0.5	SA-Q-4-SS-0.5	SA-Q-3-SB-6-D
SA-Q-3-WS-12	AT-Q-28-WS-16'	SA-Q-4-SB-6
AT-Q-29-SB-6'		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the MS/MSD, LCS, surrogate, and internal standards had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?				x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 $^{o}C \pm 2\ ^{o}C$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks) (Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants-methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	x		
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Several samples and their reanalyses had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogate recoveries	Surrogates	Surrogate Limits
SA-Q-2-SS-0.5	**60**	BFB	68-121
SA-Q-2-SS-0.5RA	**58**	BFB	68-121
AT-Q-27-SB-6'	**44**	BFB	68-121
AT-Q-27-SB-6'RA	**62**	BFB	68-121
AT-Q-28-SB-6'-DUP	**44**	BFB	68-121
AT-Q-28-SB-6'-DUPRA	**55**	BFB	68-121
SA-Q-3-SS-0.5	**44**	BFB	68-121
SA-Q-3-SS-0.5RA	**43**	BFB	68-121
SA-Q-3-WS-12	**38 / 62**	BFB / TOL	68-121/ 65-128
SA-Q-3-WS-12RA	**67 / 56**	BFB / TOL	68-121 / 65-128
SA-Q-4-SB-6	**56 / 56 / 14**	BFB / DBFM / TOL	68-121 / 66-127 / 65-128
SA-Q-4-SB-6RA	**60**	TOL	65-128

BFB = 4-Bromofluorobenzene DBFM = Dibromofluoromethane TOL = Toluene-d8

Field ID	Analyte	Qualification	Code
SA-Q-2-SS-0.5	All VOC analytes	J/UJ	s
SA-Q-2-SS-0.5RA	All VOC analytes	J/UJ	s
AT-Q-27-SB-6'	All VOC analytes	J/UJ	s
AT-Q-27-SB-6'RA	All VOC analytes	J/UJ	s
AT-Q-28-SB-6'-DUP	All VOC analytes	J/UJ	s
AT-Q-28-SB-6'-DUPRA	All VOC analytes	J/UJ	s
SA-Q-3-SS-0.5	All VOC analytes	J/UJ	s
SA-Q-3-SS-0.5RA	All VOC analytes	J/UJ	s
SA-Q-3-WS-12	All VOC analytes	J/UJ	s
SA-Q-3-WS-12RA	All VOC analytes	J/UJ	s
SA-Q-4-SB-6	All VOC analytes	J/UJ	s
SA-Q-4-SB-6RA	All VOC analytes	J/UJ	s

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: Sample AT-Q-29-SB-6' was spiked and analyzed for VOCs, with recoveries outside QC limits. These analytes were reported non-detect. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note: Several analytes were outside QC limits for the LCS samples. Qualifications are listed below.

LCS ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-10962	2-Butanone	**15**	30-149
LCS 680-10962	2-Butanone	**15**	30-149
LCS 680-10962	2-Butanone	**15**	30-149

Field ID	Analyte	Qualification	Code
SA-Q-4-SB-6RA	2-Butanone	J	L
AT-Q-29-SB-6'	2-Butanone	J	L

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?		x	
	Area > +100% Area < -50% Area < -10%			
	Positive J J J			
	Non-detect None UJ R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: Several samples had internal standards outside QC limits; qualifications are listed below.

Field ID	Analyte	IS Recoveries Low/High	Internal Standards	Qualification	Code
SA-Q-2-SS-0.5	All VOC analytes	IS Recoveries Low	CBZ	J/UJ	I
AT-Q-27-SB-6	All VOC analytes	IS Recoveries Low	DFB / CBZ	J/UJ	I
AT-Q-28-SB-6'	All VOC analytes	IS Recoveries Low	DFB / CBZ	J/UJ	I
SA-Q-3-SS-0.5	All VOC analytes	IS Recoveries Low	DCA / DFB / CBZ	J/UJ	I
SA-Q-3-WS-12	All VOC analytes	IS Recoveries Low	DFB / CBZ	J/R	I
SA-Q-2-SS-0.5RA	All VOC analytes	IS Recoveries Low	CBZ	J/UJ	I
AT-Q-27-SB-6'RA	All VOC analytes	IS Recoveries Low	CBZ	J/UJ	I
AT-Q-28-SB-6'-DUPRA	All VOC analytes	IS Recoveries Low	CBZ	J/UJ	I
SA-Q-3-SS-0.5RA	All VOC analytes	IS Recoveries Low	DFB / CBZ	J/UJ	I
SA-Q-3-WS-12RA	All VOC analytes	IS Recoveries Low	DCA / DFB / CBZ	J/R	I
SA-Q-4-SB-6	All VOC analytes	IS Recoveries Low	DFB	J/UJ	I

DCA = 1,2-Dichloroethane-d4 DFB = 1,4-Difluorobenzene CBZ = Chlorobenzene-d5

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: SA-Q-3-SB-6 and AT-Q-28-SB-6' were the parent samples of SA-Q-3-SB-6-D and AT-Q-28-SB-6'-DUP.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
14.2	Number of samples:	19			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	30			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**95.2**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/4/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS004
		Review Level:	Level III

Major Anomalies:

Several samples were rejected due to holding times and surrogate recoveries.

Minor Anomalies:

Several samples were qualified due to surrogate, LCS, and internal standard recoveries.

Field IDs:

SA-Q-2-SS-0.5	SA-Q-2-SB-4	AT-Q-24-SB-6
AT-Q-24-SS-0.5	AT-Q-26-SB-6	AT-Q-26-SS-1.5'
AT-Q-27-SB-6'	AT-Q-27-SS-1'	AT-Q-28-SB-6'
AT-Q-28-SB-6'-DUP	AT-Q-28-SS-1.5'	SA-Q-3-SS-0.5
SA-Q-3-SB-6	SA-Q-3-SB-6-D	SA-Q-3WS-12
SA-Q-4-SS-0.5	SA-Q-4-SB-6	AT-Q-29-SB-6'
AT-Q-28-WS-16'		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: Samples were reanalyzed outside of holding time.
The MS/MSD, LCS, internal standards, and surrogates had recoveries outside QC limits.
The method blank had detections above the MDL.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: All samples were re-extracted at least 25 days outside of holding time. The original analyses will be used.

Field ID	Analytes	Qualification	Code
SA-Q-2-SS-0.5RA	All SVOC analytes	R	H
SA-Q-2-SB-4RA	All SVOC analytes	R	H
AT-Q-26-SB-6RA	All SVOC analytes	R	H
AT-Q-26-SS-1.5RA	All SVOC analytes	R	H
AT-Q-27-SB-6RA	All SVOC analytes	R	H
AT-Q-27-SS-1'RA	All SVOC analytes	R	H
AT-Q-28-SB-6'RA	All SVOC analytes	R	H
AT-Q-28-SB-6'-DUPRA	All SVOC analytes	R	H
AT-Q-28-SS-1.5'RA	All SVOC analytes	R	H
SA-Q-3-SS-0.5RA	All SVOC analytes	R	H
SA-Q-3-SB-6RA	All SVOC analytes	R	H
SA-Q-3-SB-6RA2	All SVOC analytes	R	H
SA-Q-3-SB-6-DRA	All SVOC analytes	R	H
SA-Q-3-SB-6-DRA2	All SVOC analytes	R	H
SA-Q-3-SB-6-DRA3	All SVOC analytes	R	H
SA-Q-3-WS-12RA	All SVOC analytes	R	H
SA-Q-4-SS-0.5RA	All SVOC analytes	R	H
SA-Q-4-SB-6RA	All SVOC analytes	R	H
AT-Q-29-SB-6'RA	All SVOC analytes	R	H
AT-Q-28-WS-16'RA	All SVOC analytes	R	H
AT-Q-28-WS-16'RA2	All SVOC analytes	R	H

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	x		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: Diethyl phthalate had a positive result in the method blank. However, all associated samples were reported as non-detect; therefore no qualification of data was required.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?	x		
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Several samples had surrogate recoveries below QC limits. The qualifications based on these recoveries are listed below. Information regarding the specific surrogate recoveries can be submitted upon request.

Field ID	Analyte	Qualification	Code
AT-Q-27-SB-6RE	All SVOCs	J/UJ	S
AT-Q-27-SS-1	All SVOCs	J/UJ	S
AT-Q-28-SB-6RE	All SVOCs	J/UJ	S
AT-Q-28-SB-6-DUPRE	All SVOCs	J/UJ	S
AT-Q-28-SS-1.5	All SVOCs	J/UJ	S
SA-Q-3-SB-6	All SVOCs	J/UJ	S
SA-Q-3-SB-6-D	All SVOCs	J/UJ	S
SA-Q-3-WS-12RE	All SVOCs	J/UJ	S
SA-Q-4-SB-6	All SVOCs	J/UJ	S
AT-Q-29-SB-6	All detected SVOCs	J	S
AT-Q-28-WS-16	All SVOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: Samples AT-Q-29-SB-6 and AT-Q-24-SB-6 were used as the MS/MSD. Several analytes were outside QC limits for the MS/MSD samples; qualifications are listed below.

Field ID	Analytes	MS/MSD Recoveries	RPD	Quals	Code
AT-Q-29-SB-6'	All SVOCs	All Below QC limits	All within QC limits	J/UJ	M
AT-Q-24-SB-6	All SVOCs	All Below QC limits	All within QC limits	J/UJ	M

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note: One LCS sample had several analytes outside QC limits; qualifications are listed below.

LCS ID	Analytes	LCS Recoveries	LCS Limits
LCS 680-10237/21-B	Acenaphthene	30	36-108
LCS 680-10237/21-B	Acenaphthylene	29	41-112
LCS 680-10237/21-B	Anthracene	31	46-115
LCS 680-10237/21-B	Benzo(a)anthracene	31	46-116
LCS 680-10237/21-B	Benzo(a)pyrnee	31	37-120
LCS 680-10237/21-B	Benzo(b)fluoranthene	30	35-122
LCS 680-10237/21-B	Benzo(g,h,i)perylene	29	41-122
LCS 680-10237/21-B	Benzo(k)fluoranthene	35	25-124
LCS 680-10237/21-B	Bis(2-chloroethoxy)methane	30	38-106
LCS 680-10237/21-B	Bis(2-chloroethyl)ether	25	30-98
LCS 680-10237/21-B	4-Bromophenyl phenyl ether	27	38-106
LCS 680-10237/21-B	Butyl benzyl phthalate	32	42-127
LCS 680-10237/21-B	Carbazole	30	47-118
LCS 680-10237/21-B	4-Chloro-3-methylphenol	28	39-113
LCS 680-10237/21-B	2Chloronaphthalene	28	41-110
LCS 680-10237/21-B	2-Chlorophenol	25	36-99
LCS 680-10237/21-B	4-Chlorophenyl phenyl ether	28	42-111
LCS 680-10237/21-B	Chrysene	34	46-118
LCS 680-10237/21-B	Dibenz(a,h)anthracene	30	41-124
LCS 680-10237/21-B	Dibenzofuran	29	44-108

LCS ID	Analytes	LCS Recoveries	LCS Limits
LCS 680-10237/21-B	1,3-Dichlorobenzene	23	34-90
LCS 680-10237/21-B	1,2-Dichlorobenzene	24	35-93
LCS 680-10237/21-B	1,4-Dichlorobenzene	24	32-90
LCS 680-10237/21-B	2,4-Dichlorophenol	28	43-108
LCS 680-10237/21-B	Diethyl phthalate	28	41-118
LCS 680-10237/21-B	2,4-Dimethylphenol	26	40-112
LCS 680-10237/21-B	Dimethyl phthalate	29	43-114
LCS 680-10237/21-B	Di-n-butyl phthalate	28	35-93
LCS 680-10237/21-B	2,6-Dinitrotoluene	32	38-128
LCS 680-10237/21-B	Di-n-octyl phthalate	28	43-129
LCS 680-10237/21-B	Fluoranthene	31	41-124
LCS 680-10237/21-B	Fluorene	29	37-113
LCS 680-10237/21-B	Hexachlorobenzene	32	46-115
LCS 680-10237/21-B	Hexachlorobutadiene	23	42-105
LCS 680-10237/21-B	Hexachlorocyclopentadiene	17	20-109
LCS 680-10237/21-B	Hexachloroethane	22	31-88
LCS 680-10237/21-B	Indeno [1,2,3-cd]pyrene	29	36-133
LCS 680-10237/21-B	Isophorone	27	37-106
LCS 680-10237/21-B	2-Methylnaphthalene	27	39-104
LCS 680-10237/21-B	2-Methylphenol	26	38-107
LCS 680-10237/21-B	3 & 4 Methylphenol	29	37-106
LCS 680-10237/21-B	Naphthalene	26	34-97
LCS 680-10237/21-B	4-Nitroaniline	28	32-130
LCS 680-10237/21-B	2-Nitroaniline	24	38-124
LCS 680-10237/21-B	Nitrobenzene	21	33-106
LCS 680-10237/21-B	4-Nitrophenol	18	21-132
LCS 680-10237/21-B	2-Nitrophenol	24	38-104
LCS 680-10237/21-B	Pentachlorophenol	13	27-116
LCS 680-10237/21-B	Phenanthrene	31	47-114
LCS 680-10237/21-B	Phenol	27	34-98
LCS 680-10237/21-B	Pyrene	25	36-128
LCS 680-10237/21-B	1,2,4-Trichlorobenzene	14	36-98
LCS 680-10237/21-B	2,4,5-Trichlorobenzene	30	46-116
LCS 680-10237/21-B	2,4,6-Trichlorophenol	29	44-113

Field ID	Analytes	Qualification	Code
AT-Q-27-SB-6	All SVOCs	J/UJ	L
AT-Q-27-SS-1	All SVOCs	J/UJ	L
AT-Q-28-SB-6	All SVOCs	J/UJ	L
AT-Q-28-SB-6D	All SVOCs	J/UJ	L
AT-Q-28-SS-1.5	All SVOCs	J/UJ	L
SA-Q-3-SS-0.5	All SVOCs	J/UJ	L
SA-Q-3-SB-6	All SVOCs	J/UJ	L
SA-Q-3-SB-6-D	All SVOCs	J/UJ	L
SA-Q-3-WS-12	All SVOCs	J/UJ	L
SA-Q-4-SB-6	All SVOCs	J/UJ	L
AT-Q-29-SB-6	All SVOCs	J/UJ	L

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?					x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: Certain internal standards were outside QC limits; qualifications are listed below.

Field ID	Analyte	Qualification	Code
SA-Q-3-SB-6-DRE	All detected SVOCs	J	I
SA-Q-2-SS-0.5RE	All detected SVOCs	J	I
SA-Q-2-SB-4	All detected SVOCs	J	I
AT-Q-26-SB-6	All detected SVOCs	J	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: SA-Q-3-SB-6 and AT-Q-28-SB-6' were the parent samples of SA-Q-3-SB-6-D and AT-Q-28-SB-6'-DUP.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
14.2	Number of samples:	19			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	63			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**94.9**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES ANALYSIS

Reviewer:	Amelia Turnell	**Project Name:**	Sauget - Area 2
Date:	10/13/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS003
		Review Level:	Level III

Major Anomalies:

Some sample re-extractions were rejected due to holding times.

Minor Anomalies:

Samples were qualified based on holding times and surrogates.

Field IDs:

SA-Q-15-SS-0.5	SA-Q-13-SS-1	SA-Q-9-SS-0.5
SA-Q-15-SB-2	SA-Q-13-SB-2	SA-Q-9-SB-5
SA-Q-14-SS-0.5	SA-Q-11-SS-0.5	SA-Q-9-SB-5-D
SA-Q-14-SB-5	SA-Q-11-SB-2	SA-Q-10-SS-0.5
	SA-Q-10-SB-2	SA-Q-10-SS-0.5-D

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that samples were extracted out of hold time. Surrogates, LCS, MS/MSD were outside quality control limits. Several samples were diluted. Although it is beyond the scope of this review, it should be noted that CCVs for different clocks exceeded the %D for several compounds; thus the grand mean exception rule was applied to several samples.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: All samples were re-extracted outside hold time. Qualifications are listed below.

Field ID	Analytes	Qualification	Code
SA-Q-15-SS-0.5 RE	All Pesticides	UJ/J	h
SA-Q-15-SB-2 RE	All Pesticides	UJ/J	h
SA-Q-14-SS-0.5 RE	All Pesticides	UJ/J	h
SA-Q-14-SB-5 RE	All Pesticides	UJ/J	h
SA-Q-13-SS-1 RE	All Pesticides	UJ	h
SA-Q-13-SB-2 RE	All Pesticides	UJ/J	h
SA-Q-11-SS-0.5 RE	All Pesticides	R	h
SA-Q-11-SB-2 RE	All Pesticides	R	h
SA-Q-9-SS-0.5 RE	All Pesticides	R	h
SA-Q-9-SB-5 RE	All Pesticides	R	h
SA-Q-9-SB-5-D RE	All Pesticides	R	h
SA-Q-10-SS-0.5 RE	All Pesticides	R	h
SA-Q-10-SS-0.5-D RE	All Pesticides	R	h
SA-Q-10-SB-2 RE	All Pesticides	R	h

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?			x
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?				x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?					x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?				x		
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)				x		
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogates	Surrogate recoveries	Recovery limits
SA-Q-13-SS-1	Tetrachloro-m-xylene	26	30-150
SA-Q-13-SB-2	Tetrachloro-m-xylene	29	30-150
SA-Q-11-SB-2	Decachlorobiphenyl-13C12	479	30-150
SA-Q-11-SB-2 RE	Decachlorobiphenyl-13C12	282	30-150
SA-Q-9-SB-5	Tetrachloro-m-xylene	20	30-150
SA-Q-9-SB-5-D	Tetrachloro-m-xylene	16	30-150
SA-Q-10-SB-2	Decachlorobiphenyl-13C12	349	30-150
SA-Q-10-SB-2 DL	Decachlorobiphenyl-13C12	327	30-150
SA-Q-10-SB-2 RE	Decachlorobiphenyl-13C12	188	30-150

Field ID	Analytes	Qualification	Code
SA-Q-13-SS-1	All analytes	UJ/J	S
SA-Q-13-SB-2	All analytes	UJ/J	S
SA-Q-11-SB-2	Detected analytes	J	S
SA-Q-11-SB-2 RE	None	Already R due to hold time	S
SA-Q-9-SB-5	All analytes	UJ	S
SA-Q-9-SB-5-D	All analytes	UJ	S
SA-Q-10-SB-2	Detected analytes	J	S
SA-Q-10-SB-2 DL	Detected analytes	J	S
SA-Q-10-SB-2 RE	None	Already R due to hold time	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: Several recoveries and RDPs were out for the MS/MSD sample SA-Q-13-SS-1. No qualifiers were assigned.

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note: The LCS had recoveries outside the QC limits.

Field ID	Analytes	LCS / LCSD / RPD Recoveries	LCS / LCSD / RPD Limits
LCSD 680-12974	Endosulfan I	1120/175	31-124/50
LCS/LCSD 680-12974	Endosulfan II	RPD 58	RPD Limit 50
LCS/LCSD 680-13400	Beta-BHC	RPD 99	RPD Limit 50

Endosulfan I, endosulfan II and beta-BHC were non-detect for related samples. Therefore, no qualifiers were assigned.

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations.			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?	x		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample SA-Q-9-SB-5 was the parent sample to SA-Q-9-SB-5-D and sample SA-Q-10-SS-0.5 was the parent to SA-Q-10-SS-0.5-D.

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
13.2	Number of samples:	14			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/5/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS004
		Review Level:	Level III

Major Anomalies:

Several samples were reanalyzed outside QC limits, qualifications are listed below.

Minor Anomalies:

Several analytes were qualified due to surrogate and LCS recoveries.

Field IDs:

SA-Q-2-SS-0.5	SA-Q-2-SB-4	AT-Q-24-SB-6
AT-Q-24-SS-0.5	AT-Q-26-SB-6	AT-Q-26-SS-1.5'
AT-Q-27-SB-6'	AT-Q-27-SS-1'	AT-Q-28-SB-6'
AT-Q-28-SB-6'-DUP	AT-Q-28-SS-1.5'	SA-Q-3-SB-6
SA-Q-3-SB-6-D	SA-Q-3-WS-12	SA-Q-4-SB-6
AT-Q-28-WS-16'		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS, surrogate, MS/MSD, and internal standard recoveries were outside QC limits. Although it is beyond the scope of this review, it should be noted that the ICAL and CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: Two samples that were reanalyzed exceeded the holding time criteria; qualifications are listed below.

Field ID	Analytes	Qualifications	Days late	Code
SA-Q-2-SB-4RA	All PCB analytes	R	35	H
SA-Q-3-WS-12RA	All PCB analytes	R	34	H

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	x		
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note:

Sample ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-Q-2-SB-4	Decachlorobiphenyl-13C12	24	30-130

Sample ID	Analytes	Qualification	Code
SA-Q-2-SB-4	All PCB analytes	UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: Sample AT-Q-29-SB-6 MS/MSD recoveries were outside QC limits. However, related LCS samples had recoveries within QC limits. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note: The LCS had recoveries outside the QC limits; qualifications are listed below.

LCS ID	Analytes	LCS Recoveries	LCS Limits
LCS 680-10400	Endosulfan II, Endrin ketone	22 / 42	31-127 / 47-156

Sample ID	Analytes	Qualification	Code
AT-Q-26-SS-1.5'	Endosulfan II, Endrin ketone	UJ	L
AT-Q-27-SB-6'	Endosulfan II, Endrin ketone	UJ	L
AT-Q-27-SS-1'	Endosulfan II, Endrin ketone	UJ	L
AT-Q-28-SB-6'	Endosulfan II, Endrin ketone	UJ	L
AT-Q-28-SB-6'-DUP	Endosulfan II, Endrin ketone	UJ	L
AT-Q-28-SS-1.5'	Endosulfan II, Endrin ketone	UJ	L
SA-Q-3-WS-12	Endosulfan II, Endrin ketone	UJ	L
SA-Q-4-SB-6	Endosulfan II, Endrin ketone	UJ	L

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?	x		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: SA-Q-3-SB-6 and AT-Q-28-SB-6' were the parent samples of SA-Q-3-SB-6-D and AT-Q-28-SB-6'-DUP.

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
13.2	Number of samples:	16			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/3/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS004
		Review Level:	Level III

Major Anomalies:

Sample SA-Q-3-WS-12 was re-extracted outside of holding time limits, qualifications are listed below.

Minor Anomalies:

Samples were qualified based on MS/MSD, LCS, and surrogate recoveries.

Field IDs:

SA-Q-2-SS-0.5	SA-Q-2-SB-4	AT-Q-24-SB-6
AT-Q-24-SS-0.5	AT-Q-26-SB-6	AT-Q-26-SS-1.5
AT-Q-27-SB-6'	AT-Q-27-SS-1'	AT-Q-28-SB-6'
AT-Q-28-SB-6'-DUP	AT-Q-28-SS-1.5	SA-Q-3-SS-0.5
SA-Q-3-SB-6	SA-Q-3-SB-6-D	AT-Q-28-WS-16'
SA-Q-4-SS-0.5	SA-Q-4-SB-6	AT-Q-29-SB-6'

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the surrogates, LCS, and MS/MSD had recoveries outside the QC limits.
One sample was re-extracted outside holding time limits.
Although it is not part of this review, it should be noted that the ICAL and CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code h)

		Yes	No	NA
2.1	Do sample preservation, collection and storage conditions meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/ R(-).	x		

Note: Sample SA-Q-3-WS-12 was re-extracted 18 days outside of holding time limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
SA-Q-3-WS-12 RE	All herbicide analytes	R	H

3.0 Blanks (Method Blanks and Field Blanks)

(Code x - Field Blank Contamination, Code z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 Initial Calibration (Code r)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code c)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			x

Note:

6.0 Surrogate Recovery (Code s)

		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?	x		
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Sample SA-Q-3-WS-12 had surrogate recoveries outside QC limits. This sample was reanalyzed with similar surrogate results. Qualifications are listed below

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-Q-3-WS-12	DCAA	22	34-127

Field ID	Analyte	Qualification	Code
SA-Q-3-WS-12	All herbicide analytes	UJ	S

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: Sample AT-Q-29-SB-6 was used as the MS/MSD. Results were outside QC limits. Qualifications are listed below.

Field ID	Analytes	MS/MSD/RPD Recoveries	MS/MSD/RPD Limits
AT-Q-29-SB-6'	Pentachlorophenol	6/36 / 40	71-109 / 50

Field ID	Analyte	Qualification	Code
AT-Q-29-SB-6'	Pentachlorophenol	J	M

8.0 Laboratory Control Sample (LCS/LCSD) (Code l - LCS recovery Code e - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note: LCS results were outside QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS/LCSD/RPD Recoveries	LCS/LCSD/RPD Limits
LCS 680-10240	Pentachlorophenol	97/178 / 59	71-109 / 50

Field ID	Analyte	Qualification	Code
AT-Q-29-SB-6'*	Pentachlorophenol	J	L
SA-Q-4-SS-0.5	Pentachlorophenol	J	L
SA-Q-4-SB-6	Pentachlorophenol	J	L
AT-Q-28-WS-16'	Pentachlorophenol	J	L

9.0 TCL Identification (Code w)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code p)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

11.0 Field Duplicate Samples (Code f)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: SA-Q-3-SB-6 and AT-Q-28-SB-6' were the parent samples of SA-Q-3-SB-6-D and AT-Q-28-SB-6'-DUP.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
12.2	Number of samples:	19			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review
Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/4/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS004
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries, method blank contamination, and laboratory duplicate RPDs.

Field IDs:

SA-Q-2-SS-0.5	SA-Q-2-SB-4	AT-Q-24-SB-6
AT-Q-24-SS-0.5	AT-Q-26-SB-6	AT-Q-26-SS-1.5'
AT-Q-27-SB-6'	AT-Q-27-SS-1'	AT-Q-28-SB-6'
AT-Q-28-SB-6'-DUP	AT-Q-28-SS-1.5'	SA-Q-3-SS-0.5
SA-Q-3-SB-6	SA-Q-3-SB-6-D	SA-Q-3-WS-12
SA-Q-4-SS-0.5	SA-Q-4-SB-6	T-Q-29-SB-6'
AT-Q-28-WS-16'		

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x									x		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C +2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the serial dilution sample and the MS/MSD were outside the QC limits.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL; however, most of the sample values were greater than 5 times the blank results. Those that were not are qualified below.

Sample ID	Analyte	Qualification	Code	New RL
AT-Q-24-SS-0.5	Sodium	U	P	260
AT-Q-28-SS-1.5'	Sodium	U	P	200
SA-Q-4-SS-0.5	Sodium	U	P	120

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x						x			
5.2	Are the ICS AB recoveries within 80% - 120%?			x						x			
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x						x			
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x						x			
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).		x									x	
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Sample AT-Q-29-SB-6 was analyzed in duplicate by the lab. Sample RPD values for laboratory duplicate samples were outside QC limits; qualifications are listed below.

Sample ID	Analyte	Qualification	Code
AT-Q-29-SB-6'	Mercury	J	K

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)	x										x	
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: Sample AT-Q-26-SB-6 was spiked and analyzed for Mercury with recoveries outside QC limits; qualifications are listed below.

Field ID	Analyte	Recovery	Criteria
AT-Q-29-SB-6	Antimony	46/50	75-125
AT-Q-29-SB-6	Copper	100/22	75-125
AT-Q-29-SB-6	Lead	38/80	75-125
AT-Q-29-SB-6	Potassium	163/143	75-125
AT-Q-26-SB-6	Mercury	108/172	75-125

Qualifications based on MS/MSD recoveries are listed below.

Field ID	Analyte	Qualification	Code
AT-Q-29-SB-6	Antimony	J	M
AT-Q-29-SB-6	Copper	J	M
AT-Q-29-SB-6	Lead	J	M
AT-Q-29-SB-6	Potassium	J	M
AT-Q-26-SB-6	Mercury	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Samples SA-Q-2-SS-0.5, AT-Q-29-SB-6, and AT-Q-28-WS-16 were diluted and reanalyzed by the lab.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)	x									x		

Samples AT-Q-28-SB-6 and AT-Q-28-SB-6-DUP are a parent/duplicate pair.

Samples SA-Q-3-SB-6 and SA-Q-3-SB-6-D are a parent/duplicate pair.

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	19		0		0		19
13.3	Number of target compounds in each analysis:	22		22		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		####		####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/3/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS004
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:

SA-Q-2-SS-0.5	SA-Q-2-SB-4	AT-Q-24-SB-6
AT-Q-24-SS-0.5	AT-Q-26-SB-6	AT-Q-26-SS-1.5'
AT-Q-27-SB-6'	AT-Q-27-SS-1'	AT-Q-28-SB-6'
AT-Q-28-SB-6'-DUP	AT-Q-28-SS-1.5	SA-Q-3-SS-0.5
SA-Q-3-SB-6	SA-Q-3-SB-6-D	SA-Q-3-WS-12
SA-Q-4-SS-0.5	SA-Q-4-SB-6	AT-Q-29-SB-6'
AT-Q-28-WS-16'		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			x

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: Sample AT-Q-29-SB-6 was analyzed as the MS/MSD. Sample concentrations were greater than 4X the spike concentrations; therefore no qualification of data was required.

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?	x		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: SA-Q-3-SB-6 and AT-Q-28-SB-6' were the parent samples of SA-Q-3-SB-6-D and AT-Q-28-SB-6'-DUP.

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		x	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < $\pm$ PQL for aqueous, and RPD < 35% or difference < $\pm$ 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
12.2	Number of samples:	6			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	7/15/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 005
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No analytes required qualification based on this data review.

Field IDs:	AA-SLAY-3-90	AA-SLAY-3-110	AA-SLAY-3-122
	AA-SLAY-2-42	TB-6	AA-SLAY-2-62
	AA-SLAY-2-82	AA-SLAY-2-102	AA-SLAY-2-102-D
	AA-SLAY-2-122	AA-SLAY-4-46	AA-SLAY-4-66
	AA-SLAY-4-86	AA-SLAY-4-106	AA-SLAY-4-126
	TB-7	Trip Blank	SA-P-1-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The case narrative indicated that the MS/MSD sample had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?				x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 $^{o}C \pm 2\ ^{o}C$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	x		
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: Toluene was detected in the field blank above the MDL; however, all associated samples were non-detect for toluene. No qualification of data was required.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: The MS/MSD sample had recoveries outside the QC limits for benzene; however, the LCS was within QC limits. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AA-SLAY-2-102 is the parent sample of AA-SLAY-2-102-D.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
14.2	Number of samples:	18			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.2 * 14.3) - 14.4) / (14.2 * 14.3)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	7/15/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 005
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:			
	AA-SLAY-3-90	AA-SLAY-3-110	AA-SLAY-3-122
	AA-SLAY-2-42	AA-SLAY-2-62	AA-SLAY-2-82
	AA-SLAY-2-102	AA-SLAY-2-102-D	AA-SLAY-2-122
	AA-SLAY-4-46	AA-SLAY-4-66	AA-SLAY-4-86
	AA-SLAY-4-106	AA-SLAY-4-126	SA-P-1-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The MS/MSD and LCS had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?	x		
3.2	Have all samples been analyzed within twelve hours of the tune?	x		
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			x
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?			x		
7.3	Are more than one of either fraction outside the acceptance criteria?			x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?					x
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?					x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/or diluted samples, then no reanalysis is required and acids and base/neutrals are assessed separately.					
		> UCL	10% to LCL	< 10%		
	Positive	J	J	J		
	Non-detect	None	UJ	R		

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: The MS/MSD sample recovered certain analytes outside QC limits. However the LCS was within QC limits for those analytes; therefore, no qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note: The LCS had %RPD values for hexachlorocyclopentadiene outside QC limits. However data is not qualified based on %RPD alone; therefore no qualification of data was required.

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AA-SLAY-2-102 is the parent sample of AA-SLAY-2-102-D.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
14.2	Number of samples:	15			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.2 x 14.3) - 14.4) / (14.2 x 14.3)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	7/15/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 005
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No qualifications were required in this SDG.

Field IDs: SA-P-1-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS recovery was outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?				x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?						x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note: The LCS had recoveries outside the QC limits. However, the LCS is associated with the field blank; therefore no qualification of data was required.

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		x	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
13.2	Number of samples:	1			
13.3	Number of target compounds in each analysis:	31			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	7/15/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 005
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs:

AA-SLAY-3-90	AA-SLAY-3-110	AA-SLAY-3-122
AA-SLAY-2-42	AA-SLAY-2-62	AA-SLAY-2-82
AA-SLAY-2-102	AA-SLAY-2-102-D	AA-SLAY-2-122
AA-SLAY-4-46	AA-SLAY-4-66	AA-SLAY-4-86
AA-SLAY-4-106	AA-SLAY-4-126	SA-P-1-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated the MS/MSD had recoveries outside the QC limits.
The narrative also indicated that the CCV had recoveries outside QC limits. This is beyond the scope of this review, although it should be noted.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage conditions meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			x

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?				x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?						x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: The MS/MSD had recoveries outside QC limits; however the LCS was within QC limits. No qualification of data was required.

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AA-SLAY-2-102 is the parent sample of AA-SLAY-2-102-D.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
12.2	Number of samples:	15			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.2 x 12.3) - 12.4) / (12.2 x 12.3)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	7/15/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS005
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries and Laboratory duplicate %RPD.

Field IDs:

AA-SLAY-3-90	AA-SLAY-3-110	AA-SLAY-3-122
AA-SLAY-2-42	AA-SLAY-2-62	AA-SLAY-2-82
AA-SLAY-2-102	AA-SLAY-2-102-D	AA-SLAY-2-122
AA-SLAY-4-46	AA-SLAY-4-66	AA-SLAY-4-86
AA-SLAY-4-106	AA-SLAY-4-126	SA-P-1-FB

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x										x	
1.4	Does sample preservation, collection and storage meet method requirements? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C $\pm$ 2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

The narrative also indicated that the serial dilution %RPDs exceeded control limits.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code C)

					ICP			ICP-MS			GFAA			CVAA-Hg		
					Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)						x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).															x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.						x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.						x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).						x									x
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)											
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%											
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%											

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action: If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).		x								x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Sample AA-SLAY-2-82 was run in duplicate. When compared, the %RPDs for aluminum were outside QC limits. Qualification is listed below.

Field ID	Analyte	Qualification	Code
AA-SLAY-2-82	Aluminum	J	K

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)		x								x		
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: The MS/MSD was above QC limits for potassium; qualification is listed below.

Field ID	Analyte	Qualification	Code
AA-SLAY-2-82	Potassium	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note:

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)	x									x		

Note: Sample AA-SLAY-2-102 is the parent sample of AA-SLAY-2-102-D.

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	15		0		0		15
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		**####**		**####**		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	7/15/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 005
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on field blank contamination and MS/MSD recoveries outside QC limits.

Field IDs:

AA-SLAY-3-90	AA-SLAY-3-110	AA-SLAY-3-122
AA-SLAY-2-42	AA-SLAY-2-62	AA-SLAY-2-82
AA-SLAY-2-102	AA-SLAY-2-102-D	AA-SLAY-2-122
AA-SLAY-4-46	AA-SLAY-4-66	AA-SLAY-4-86
AA-SLAY-4-106	AA-SLAY-4-126	SA-P-1-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: No anomalies were noted on the laboratory case narrative.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?	x		
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: The Field Blank sample had a detection above the MDL; the following qualifications were made.

Field ID	Analyte	Qualification	Code
AA-SLAY-2-42	Ammonia	U	X
AA-SLAY-2-62	Ammonia	U	X
AA-SLAY-4-46	Ammonia	U	X

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument? If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			x
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)? If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			x
5.4	If Level IV, calculate a sample of %Rs.			x

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: The MS/MSD sample had recoveries outside the QC limits; the parent sample is qualified below.

Field ID	Analyte	MS/MSD Recovery	RPD	MS/MSD/RPD Limits	Qualification	Code
AA-SLAY-2-82	Ammonia	**34/38**	4	90-110/30	J	M

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?	x		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AA-SLAY-2-102 is the parent sample of AA-SLAY-2-102-D.

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	x		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	x		

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
12.2	Number of samples:	15			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.2 x 12.3) - 12.4) / (12.2 x 12.3)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/17/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 006
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on internal standards and surrogate recoveries.

Field IDs:

SA-O-1-SS-0.5	SA-O-1-SS-0.5-D	SA-O-1-SB-3
SA-O-3-SS-0.5	SA-O-3-SB-4	SA-O-3-WS-9
SA-O-4-SS-0.5	SA-O-4-SB-6	SA-O-2-SS-0.5
SA-O-2-SB-5	SA-O-2-WS-9	SA-O-2-WS-9-D
AT-Q-25-WS-9	SA-P-1-SS-0.5	SA-P-1-SS-0.5-D
SA-P-1-SB-6	SA-P-1-WS-8	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the surrogate, LCS, and MS/MSD recoveries were outside QC limits.
Although it is beyond the scope of this review, it should be noted that the CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?				x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	$4\ ^{o}C \pm 2\ ^{o}C$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks) (Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	x		
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Two samples had surrogate recoveries outside QC limits; qualifications are listed below.

Field ID	Surrogate	Surrogate recovery	Surrogate limits
AT-Q-25-WS-9	4-Bromofluorobenzene	61	68-121
AT-Q-25-WS-9	Toluene-d8	60	65-128
AT-Q-25-WS-9RA	4-Bromofluorobenzene	62	68-121
AT-Q-25-WS-9RA	Toluene-d8	52	65-128

Field ID	Analyte	Qualification	Code
AT-Q-25-WS-9	All VOCs	J/UJ	S
AT-Q-25-WS-9RA	All VOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: Sample SA-O-3-SS-0.5 was used as the MS/MSD. Several MS/MSD recoveries were outside QC limits, however the LCS was within QC limits. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note: Several LCS recoveries were outside QC limits, however they were all associated with method blank samples only. No qualification of data was required.

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?					x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: Internal standards were outside QC limits for one sample. Qualifications are listed below.

Field ID	Analyte	Internal Standard High/Low	Qualification	Code
SA-O-1-SS-0.5-D	All VOCs	Low	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples SA-O-2-WS-9, SA-P-1-SS-0.5, and SA-O-1-SS-0.5 were the parent samples for SA-O-2-WS-9-D, SA-P-1-SS-0.5-D, and SA-O-1-SS-0.5-D.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
14.2	Number of samples:	17			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/17/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 006
		Review Level:	Level III

Major Anomalies:

Samples were rejected based on holding times and surrogate recoveries.

Minor Anomalies:

Samples were qualified based on blanks, surrogates, LCS, and MS/MSD recoveries.

Field IDs:

SA-O-1-SS-0.5	SA-O-1-SS-0.5-D	SA-O-1-SB-3
SA-O-3-SS-0.5	SA-O-3-SB-4	SA-O-3-WS-9
SA-O-4-SS-0.5	SA-O-4-SB-6	SA-O-2-SS-0.5
SA-O-2-SB-5	SA-O-2-WS-9	SA-O-2-WS-9-D
AT-Q-25-WS-9	SA-P-1-SS-0.5	SA-P-1-SS-0.5-D
SA-P-1-SB-6		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: Samples were reanalyzed outside of holding time due to QC analysis outside criteria.
The MS/MSD, surrogate, LCS, and internal standards had recoveries outside QC limits.
The method blank was spiked with the laboratory LCS solution, which required a reanalysis of several samples.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: Samples were analyzed outside of hold time.

Field ID	Analyte	Qualification	Code
SA-O-1-SS-0.5RE	All SVOCs	R	H
SA-O-1-SS-0.5REDL	All SVOCs	R	H
SA-O-1-SS-0.5-DRE	All SVOCs	R	H
SA-O-1-SS-0.5-DREDL	All SVOCs	R	H
SA-O-1-SB-3RE	All SVOCs	R	H
SA-O-3-SS-0.5RE	All SVOCs	R	H
SA-O-3-SB-6RE	All SVOCs	R	H
SA-O-3-WS-9RE	All SVOCs	R	H
SA-O-3-WS-9REDL	All SVOCs	R	H
SA-O-4-SS-0.5RE	All SVOCs	R	H
SA-O-4-SB-6RE	All SVOCs	R	H
SA-O-4-SB-6REDL	All SVOCs	R	H
SA-O-2-SS-0.5RE	All SVOCs	R	H
SA-O-2-SB-5RE	All SVOCs	R	H
SA-O-2-WS-9RE	All SVOCs	R	H
SA-O-2-WS-9REDL	All SVOCs	R	H
SA-O-2-WS-9-DRE	All SVOCs	R	H
SA-O-2-WS-9-DREDL	All SVOCs	R	H
AT-Q-25-WS-9RE	All SVOCs	R	H
AT-Q-25-WS-9REDL	All SVOCs	R	H
SA-P-1-SS-0.5RE	All SVOCs	R	H
SA-P-1-SS-0.5-DRE	All SVOCs	R	H
SA-P-1-SB-6RE	All SVOCs	R	H
SA-P-1-WS-8RE	All SVOCs	R	H

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	x		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: One of the method blanks was spiked with the LCS sample. All associated samples were qualified below.

Field ID	Analyte	Qualification	Code
SA-O-3-SB-4	All positive SVOCs	J	Z
SA-O-3-SB-4DL	All positive SVOCs	J	Z
SA-O-3-WS-9	All positive SVOCs	J	Z
SA-O-3-WS-9-DL	All positive SVOCs	J	Z
SA-O-4-SS-0.5	All positive SVOCs	J	Z
SA-O-4-SS-0.5DL	All positive SVOCs	J	Z
SA-O-4-SB-6	All positive SVOCs	J	Z
SA-O-2-SB-5	All positive SVOCs	J	Z
SA-O-2-WS-9	All positive SVOCs	J	Z
SA-O-2-WS-9DL	All positive SVOCs	J	Z
SA-P-1-SS-0.5	All positive SVOCs	J	Z
SA-P-1-SS-0.5-D	All positive SVOCs	J	Z
SA-P-1-SB-6	All positive SVOCs	J	Z
SA-P-1-SB-6DL	All positive SVOCs	J	Z
SA-P-1-WS-8	All positive SVOCs	J	Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?				x	
7.3	Are more than one of either fraction outside the acceptance criteria?			x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?				x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?					x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/or diluted samples, then no reanalysis is required and acids and base/neutrals are assessed separately.					
		> UCL	10% to LCL	< 10%		
	Positive	J	J	J		
	Non-detect	None	UJ	R		

Note: Several samples had surrogates outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate recoveries	Surrogate limits
SA-O-1-SS-0.5	2FP, FBP, NBZ, PHL, TPH	21, 24, 22, 25, 30	36-101, 38-104, 33-94, 38-102, 40-129
SA-O-1-SS-0.5RE	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-1-SB-3	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-3-SS-0.5	2FP, FBP, NBZ, PHL, TPH	22, 25, 19, 23, 34	36-101, 38-104, 33-94, 38-102, 40-129
SA-O-3-SS-0.5RE	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-3-SB-4	2FP, FBP, NBZ, PHL, TBP, TPH	15, 16, 13, 16, 18, 25	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-3-WS-9	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-3-WS-9RE	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-4-SS-0.5	2FP, NBZ, PHL	34, 31, 35	36-101, 33-94, 38-102
SA-O-4-SS-0.5RE	2FP, PHL	23, 30	36-101, 38-102
SA-O-4-SB-6	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-4-SB-6RE	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-2-SS-0.5	2FP, FBP, NBZ, PHL	28, 33, 26, 29	36-101, 38-104, 33-94, 38-102
SA-O-2-SB-5	2FP, NBZ, PHL	31, 29, 32	36-101, 33-94, 38-102
SA-O-2-SB-5RE	2FP, PHL	32, 33	36-101, 38-102
SA-O-2-WS-9	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-2-WS-9RE	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-2-WS-9-D	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-2-WS-9-DRE	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
AT-Q-25-WS-9	2FP, FBP, NBZ, PHL, TBP, TPH	2, 1, 0, 1, 1, 2	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
AT-Q-25-WS-9RE	2FP, FBP, NBZ, PHL	18, 34, 27, 23	36-101, 38-104, 33-94, 38-102
SA-P-1-SS-0.5	2FP, FBP, NBZ, PHL, TBP	24, 31, 22, 27, 13	36-101, 38-104, 33-94, 38-102, 27-124
SA-P-1-SS-0.5RE	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-P-1-SS-0.5-D	2FP, FBP, NBZ, PHL, TBP, TPH	21, 27, 20, 22, 7	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-P-1-SS-0.5-DRE	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-P-1-SB-6	2FP, FBP, NBZ, PHL	24, 31, 23, 26	36-101, 38-104, 33-94, 38-102
SA-P-1-SB-6RE	2FP, NBZ, PHL	25, 32, 33	36-101, 33-94, 38-102
SA-P-1-WS-8	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-P-1-WS-8RE	2FP, FBP, PHL, TBP	14, 37, 23, 25	36-101, 38-104, 33-94, 38-102, 27-124

Field ID	Analyte	Qualification	Code
SA-O-1-SS-0.5	All SVOCs	J/UJ	S
SA-O-1-SS-0.5RE	All SVOCs	J/R	S
SA-O-1-SB-3	All SVOCs	J/R	S
SA-O-3-SS-0.5	All SVOCs	J/UJ	S
SA-O-3-SS-0.5RE	All SVOCs	J/R	S
SA-O-3-SB-4	All SVOCs	J/UJ	S
SA-O-3-WS-9	All SVOCs	J/R	S
SA-O-3-WS-9RE	All SVOCs	J/R	S
SA-O-4-SS-0.5	All SVOCs	J/UJ	S
SA-O-4-SS-0.5RE	All SVOCs	J/UJ	S
SA-O-4-SB-6	All SVOCs	J/R	S
SA-O-4-SB-6RE	All SVOCs	J/R	S
SA-O-2-SS-0.5	All SVOCs	J/UJ	S
SA-O-2-SB-5	All SVOCs	J/UJ	S
SA-O-2-SB-5RE	All SVOCs	J/UJ	S
SA-O-2-WS-9	All SVOCs	J/R	S
SA-O-2-WS-9RE	All SVOCs	J/R	S
SA-O-2-WS-9-D	All SVOCs	J/R	S
SA-O-2-WS-9-DRE	All SVOCs	J/R	S
AT-Q-25-WS-9	All SVOCs	J/R	S
AT-Q-25-WS-9RE	All SVOCs	J/UJ	S
SA-P-1-SS-0.5	All SVOCs	J/UJ	S
SA-P-1-SS-0.5RE	All SVOCs	J/R	S
SA-P-1-SS-0.5-D	All SVOCs	J/UJ	S
SA-P-1-SS-0.5-DRE	All SVOCs	J/R	S
SA-P-1-SB-6	All SVOCs	J/UJ	S
SA-P-1-SB-6RE	All SVOCs	J/UJ	S
SA-P-1-WS-8	All SVOCs	J/R	S
SA-P-1-WS-8RE	All SVOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: For MS/MSD sample SA-O-3-SS-0.5, 33 out of 65 analytes were outside QC limits. For MS/MSD sample SA-O-2-WS-9, 57 out of 65 analytes were outside QC limits. Qualifications are listed below.

Field ID	Number of analytes out	Total analytes
SA-O-3-SS-0.5	33	65
SA-O-2-WS-9	57	65

Field ID	Analyte	Qualification	Code
SA-O-3-SS-0.5	All SVOCs	J/UJ	M
SA-O-2-WS-9	All SVOCs	J/UJ	M

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note: For LCS Sample LCS 680-10237, 55 of 65 analytes were outside QC limits. For LCS sample 680-10560, 55 of 65 analytes were outside QC limits. Qualifications are listed below.

Field ID	Analytes out of Criteria	Total analytes
LCS 680-10237	55	65
LCS 680-10560	55	65

Field ID	Analyte	Qualification	Code
SA-O-1-SS-0.5	All SVOCs	J/UJ	L
SA-O-3-SS-0.5	All SVOCs	J/UJ	L
SA-O-4-SS-0.5	All SVOCs	J/UJ	L
SA-O-2-SB-5	All SVOCs	J/UJ	L
AT-Q-25-WS-9	All SVOCs	J/UJ	L
SA-P-1-SB-6	All SVOCs	J/UJ	L
SA-O-1-SS-0.5-D	All SVOCs	J/UJ	L
SA-O-3-SB-4	All SVOCs	J/UJ	L
SA-O-4-SB-6	All SVOCs	J/UJ	L
SA-O-2-WS-9	All SVOCs	J/UJ	L
SA-P-1-SS-0.5	All SVOCs	J/UJ	L
SA-P-1-WS-8	All SVOCs	J/UJ	L
SA-O-1-SB-3	All SVOCs	J/UJ	L
SA-O-3-WS-9	All SVOCs	J/UJ	L
SA-O-2-SS-0.5	All SVOCs	J/UJ	L
SA-O-2-WS-9-D	All SVOCs	J/UJ	L
SA-P-1-SS-0.5-D	All SVOCs	J/UJ	L

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?		x	
	Area > +100% Area < -50% Area < -10%			
	Positive J J J			
	Non-detect None UJ R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: Several samples had internal standards outside QC limits. Qualifications are listed below.

Field ID	Analyte	IS Recoveries High/Low	Qualifications	Code
SA-O-1-SS-0.5DL	All SVOCs	Low	J/UJ	I
SA-O-1-SS-0.5-DDL	All SVOCs	Low	J/UJ	I
SA-P-1-SB-6DL	All detected SVOCs	High	J	I
SA-O-2-SB-5RE	All SVOCs	Low	J/UJ	I
SA-O-2-WS-9RE	All SVOCs	Low	J/UJ	I
SA-O-1-SB-3	All detected SVOCs	High	J	I
SA-O-4-SB-6	All detected SVOCs	High	J	I
SA-O-2-SB-5	All detected SVOCs	High	J	I
SA-O-2-WS-9	All detected SVOCs	High	J	I
SA-O-2-WS-9-D	All detected SVOCs	High	J	I
AT-Q-25-WS-9	All detected SVOCs	High	J	I
SA-P-1-WS-8	All detected SVOCs	High	J	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples SA-O-2-WS-9, SA-P-1-SS-0.5, and SA-O-1-SS-0.5 were the parent samples for SA-O-2-WS-9-D, SA-P-1-SS-0.5-D, and SA-O-1-SS-0.5-D.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
14.2	Number of samples:	17			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	358			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**67.6**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/18/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS006
		Review Level:	Level III

Major Anomalies:

Samples were rejected based on holding times.

Minor Anomalies:

Samples were qualified based on surrogate and LCS recoveries.

Field IDs:	SA-O-1-SB-3	SA-O-3-SB-4	SA-O-3-WS-9
	SA-O-4-SB-6	SA-O-2-SB-5	SA-O-2-WS-9
	SA-O-2-WS-9-D	AT-Q-25-WS-9	SA-P-1-WS-8

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS, surrogate, and internal standard recoveries were outside QC limits.
The narrative also indicated that holding times were outside QC limits.
Although it is beyond the scope of this review, it should be noted that the ICAL and CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: Sample SA-O-3-SB-4 was re-extracted outside hold time. Qualifications are listed below.

Field ID	Analytes	Qualification	Code
SA-O-3-SB-4RE	All PCB analytes	R	H

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?				x	
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogates	Surrogate recoveries	Recovery limits
SA-O-3-SB-4	Decachlorobiphenyl-13C12	28	30-130
SA-O-3-SB-4	Tetrachloro-m-xylene	25	30-150
SA-O-2-SB-5	Tetrachloro-m-xylene	16	30-150
AT-Q-25-WS-9	Tetrachloro-m-xylene	24	30-150

Field ID	Analytes	Qualification	Code
SA-O-3-SB-4	All PCBs and pesticides	J/UJ	S
SA-O-2-SB-5	All Pesticides	J/UJ	S
AT-Q-25-WS-9	All Pesticides	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note: The LCS had recoveries outside the QC limits. Qualifications are listed below.

Field ID	Analytes	LCS / LCSD / RPD Recoveries	LCS / LCSD / RPD Limits
LCS 680-12541	Monochlorobiphenyl	29	30-130
LCS 680-12541	Tetrachlorobiphenyl	37	40-140
LCS 680-10717	DCB Decachlorobiphenyl	28	30-130
LCS 680-10717	Dichlorobiphenyl	27	30-130
LCS 680-10717	Heptachlorobiphenyl	31	40-140
LCS 680-10717	Hexachlorobiphenyl	30	40-140
LCS 680-10717	Monochlorobiphenyl	24	30-130
LCS 680-10717	Octachlorobiphenyl	30	40-140
LCS 680-10717	Tetrachlorobiphenyl	28	40-140
LCS 680-10717	Pentachlorobiphenyl	31	40-140
LCS 680-10717	Trichlorobiphenyl	29	30-130
LCS 680-10400	Endosulfan II	32 / 22 / 38	31-127 / 50
LCS 680-10400	Endrin ketone	65 / 42 / 30	47-156 / 50
LCS 680-10553	Endosulfan II	25 / 28 / 11	31-127 / 50

Field ID	Analytes	Qualifications	Code
SA-O-3-SB-4RE	Monochlorobiphenyl	J	L
SA-O-3-SB-4RE	Tetrachlorobiphenyl	UJ	L
SA-O-3-WS-9	All PCBs	J/UJ	L
SA-O-4-SB-6	All PCBs	J/UJ	L
SA-O-2-SB-5	All PCBs	J/UJ	L
SA-O-2-WS-9	All PCBs	J/UJ	L
SA-O-2-WS-9-D	All PCBs	J/UJ	L
AT-Q-25-WS-9	All PCBs	J/UJ	L
SA-P-1-WS-8	All PCBs	J/UJ	L
SA-O-1-SB-3	Endosulfan II	UJ	L
SA-O-1-SB-3	Endrin ketone	UJ	L
SA-O-3-SB-4	Endosulfan II	UJ	L
SA-O-3-SB-4	Endrin ketone	UJ	L
SA-O-4-SB-6	Endosulfan II	UJ	L
SA-O-2-WS-9-D	Endosulfan II	UJ	L
SA-O-2-SB-5	Endosulfan II	UJ	L
AT-Q-25-WS-9	Endosulfan II	J	L
SA-O-3-WS-9	Endosulfan II	UJ	L
SA-O-2-WS-9	Endosulfan II	UJ	L
SA-P-1-WS-8	Endosulfan II	UJ	L

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?	x		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples SA-O-2-WS-9 is the parent samples of SA-O-2-WS-9-D.

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
13.2	Number of samples:	9			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/18/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 006
		Review Level:	Level III

Major Anomalies:

Samples were rejected based on surrogate recoveries.

Minor Anomalies:

Samples were qualified based on holding times, surrogate, LCS, and MS/MSD recoveries.

Field IDs:

SA-O-1-SS-0.5	SA-O-1-SS-0.5-D	SA-O-1-SB-3
SA-O-3-SS-0.5	SA-O-3-SB-4	SA-O-3-WS-9
SA-O-4-SS-0.5	SA-O-4-SB-6	SA-O-2-SS-0.5
SA-O-2-SB-5	SA-O-2-WS-9	SA-O-2-WS-9-D
AT-Q-25-WS-9	SA-P-1-SS-0.5	SA-P-1-SS-0.5-D
SA-P-1-SB-6	SA-P-1-WS-8	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the MS/MSD, LCS, and surrogate recoveries were outside the QC limits.
It was also noted that the holding times for several samples were past limits.
Although it is beyond the scope of this review, it should be noted that the ICAL and CCV were outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage conditions meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: Several samples were analyzed outside of holding times. Qualifications are listed below.

Field ID	Analytes	Days late	Qualification	Code
SA-O-4-SS-0.5DL	All herbicides	1	J/UJ	H
SA-O-4-SB-6DL	All herbicides	1	J/UJ	H
SA-O-2-SB-5DL	All herbicides	1	J/UJ	H
SA-O-2-WS-9DL	All herbicides	1	J/UJ	H
SA-O-2-WS-9-DDL	All herbicides	1	J/UJ	H
AT-Q-25-WS-9DL	All herbicides	1	J/UJ	H
SA-P-1-SS-0.5DL	All herbicides	1	J/UJ	H

3.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?	x		
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Several surrogates were outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-O-2-SB-5	DCAA	3	34-127
SA-O-2-SB-5DL	DCAA	0	34-127
SA-P-1-WS-8	DCAA	0	34-127

Field ID	Analytes	Qualification	Code
SA-O-2-SB-5	All Herbicides	J/R	S
SA-O-2-SB-5DL	All Herbicides	J/R	S
SA-P-1-WS-8	All Herbicides	J/R	S

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: Sample SA-O-3-SS-0.5 was used as the MS/MSD sample. The MS/MSD sample had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
SA-O-3-SS-0.5	Pentachlorophenol	-133 / 179 / 60	71-109 / 50

Field ID	Analyte	Qualification	Code
SA-O-3-SS-0.5	Pentachlorophenol	J	M

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note: The LCS sample had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	LCS / LCSD Recoveries	LCS / LCSD Limits
LCS 680-10240	Pentachlorophenol	97 / 178 / 59	71-109 / 50

Field ID	Analyte	Qualification	Code
SA-O-1-SS-0.5	Pentachlorophenol	J	L
SA-O-1-SS-0.5-D	Pentachlorophenol	J	L
SA-O-1-SB-3	Pentachlorophenol	J	L
SA-O-3-SS-0.5*	Pentachlorophenol	J	L
SA-O-3-SB-4	Pentachlorophenol	J	L

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples SA-O-2-WS-9, SA-P-1-SS-0.5, and SA-O-1-SS-0.5 were the parent samples for SA-O-2-WS-9-D, SA-P-1-SS-0.5-D, and SA-O-1-SS-0.5-D.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
12.2	Number of samples:	17			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	17			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**90**			

Note:

DATA VALIDATION WORKSHEET - Level III Review

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/18/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 006
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples required qualification based on holding times, MS/MSD recoveries, and field duplicate RPDs.

Field IDs:

SA-O-1-SS-0.5	SA-O-1-SS-0.5-D	SA-O-1-SB-3
SA-O-3-SS-0.5	SA-O-3-SB-4	SA-O-3-WS-9
SA-O-4-SS-0.5	SA-O-4-SB-6	SA-O-2-WS-9
SA-O-2-SS-0.5	SA-O-2-SB-5	SA-P-1-SS-0.5
SA-O-2-WS-9-D	AT-Q-25-WS-9	SA-P-1-WS-8
SA-P-1-SS-0.5-D	SA-P-1-SB-6	

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x									x		
1.4	Does sample preservation, collection and storage meet method requirements? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C +2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.
The narrative also indicated that several mercury samples were analyzed outside holding times.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x								x		
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note: Several mercury samples were prepared outside holding times. Qualifications are listed below.

Field ID	Analyte	Days late	Qualification	Code
SA-O-1-SS-0.5	Mercury	3	J	H
SA-O-1-SS-0.5-D	Mercury	3	J	H
SA-O-1-SB-3	Mercury	3	J	H
SA-O-3-WS-9	Mercury	7	J	H
SA-O-4-SS-0.5	Mercury	1	J	H
SA-O-4-SB-6	Mercury	7	J	H
SA-O-2-SS-0.5	Mercury	1	J	H
SA-O-2-SB-5	Mercury	1	J	H
SA-O-2-WS-9	Mercury	7	J	H
SA-O-2-WS-9-D	Mercury	7	J	H
AT-Q-25-WS-9	Mercury	1	J	H
SA-P-1-SB-6	Mercury	6	J	H

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action: If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).	x									x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Samples SA-O-3-SS-0.5 and SA-P-1-SB-6 were analyzed in duplicate.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)		x									x	
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: Sample SA-O-3-SS-0.5 was spiked and analyzed for metals and sample SA-P-1-SB-6 was spiked and analyzed for mercury. Qualifications are listed below.

Field ID	Analyte	Recoveries	Limits
SA-O-3-SS-0.5	Antimony	42 / 41 / 3	75-125 / 20
SA-P-1-SB-6	Mercury	232 / 671 / 53	80-120 / 20

Field ID	Analyte	Qualification	Code
SA-O-3-SS-0.5	Antimony	UJ	M
SA-P-1-SB-6*	Mercury	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Samples SA-O-3-SS-0.5, SA-0-4-SS-0.5, SA-P-1-SS-0.5, and SA-P-1-SB-6 were diluted and analyzed.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < + 2 x PQL and for solids, RPD < 100% or difference < +4 x PQL)		x								x		

Note: Samples SA-O-2-WS-9, SA-P-1-SS-0.5, and SA-O-1-SS-0.5 were the parent samples for SA-O-2-WS-9-D, SA-P-1-SS-0.5-D, and SA-O-1-SS-0.5-D. Some duplicate samples were outside QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
SA-P-1-SS-0.5	Lead	J	F
SA-P-1-SS-0.5-D	Lead	J	F

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)							
13.2	Number of samples:	17		0		0		17
13.3	Number of target compounds in each analysis:	22		22		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		####		####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Bradenburg	**Project Name:**	Sauget - Area 2
Date:	8/16/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 006
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified due to method blanks and field duplicate RPDs.

Field IDs:

SA-O-1-SS-0.5	SA-O-1-SS-0.5-D	SA-O-1-SB-3
SA-O-3-SS-0.5	SA-O-3-SB-4	SA-O-3-WS-9
SA-O-4-SS-0.5	SA-4-SB-6	SA-O-2-SS-0.5
SA-O-2-SB-5	SA-O-2-WS-9	SA-O-2-WS-9-D
AT-Q-25-WS-9	SA-P-1-SS-0.5	SA-P-1-SS-0.5-D
SA-P-1-SB-6	SA-P-1-WS-8	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?	x		
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: One of the method blank samples was recovered above the MDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
SA-P-1-SS-0.5	Ammonia	U	0.24	Z
SA-P-1-SS-0.5-D	Ammonia	U	0.21	Z

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			x

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: Sample SA-O-3-SS-0.5 was used as the MS/MSD sample. The MS/MSD parent sample concentrations were greater than 4X the spike concentrations, therefore no evaluation of data was required.

7.0 Laboratory Control Sample (LCS/LCSD) (Code L- LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?	x		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		x	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples SA-O-2-WS-9, SA-P-1-SS-0.5, and SA-O-1-SS-0.5 were the parent samples for SA-O-2-WS-9-D, SA-P-1-SS-0.5-D, and SA-O-1-SS-0.5-D.

Field ID	Field Duplicate ID	Qualification	Code
SA-O-1-SS-0.5	SA-O-1-SS-0.5-D	J	F

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	x		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	x		

Note: Sample SA-O-2-SS-.5 was analyzed in duplicate.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
12.2	Number of samples:	17			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	7/14/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS007
		Review Level:	Level III

Major Anomolies:

No samples were rejected.

Minor Anomolies:

No analytes required qualification, based on this data review.

Field IDs:

AA-SLAY-2-138
AA-SLAY-4-140
AA-SLAY-1-FB
AA-SLAY-1-34
AA-SLAY-1-54
TB-8

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: No anomalies were noted in the case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?				x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is ouside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 $^{o}C \pm 2\ ^{o}C$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	x		
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: Toluene was detected above the MDL in the field blank AA-SLAY-1-FB. The associated samples were non-detect for toluene; therefore, no qualification of data was required.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note:

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		
	Area > +100% / Area < -50% / Area < -10%			
	Positive: J / J / J			
	Non-detect: None / UJ / R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgement, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outsidethe acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
14.2	Number of samples:	6			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2) .				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	7/14/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 007
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on Internal Standards outside QC limits.

Field IDs:

AA-SLAY-2-138
AA-SLAY-4-140
AA-SLAY-1-FB
AA-SLAY-1-34
AA-SLAY-1-54

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The case narrative indicated that the internal standards had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			x
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?	x		
7.3	Are more than one of either fraction outside the acceptance criteria?		x	
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?			x
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/or diluted samples, then no reanalysis is required and acids and base/neutrals are assessed separately.			
	> UCL / 10% to LCL / < 10%			
	Positive: J / J / J			
	Non-detect: None / UJ / R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?					x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: The internal standards for sample AA-SLAY-2-138 had recoveries outside QC limits; the qualifications are listed below.

Field ID	Analyte	IS Recoveries	Internal Standards	IS Limits	Qualification	Code
AA-SLAY-2-138	All SVOCs	92765 / 393170 / 288498	DCB/NPT/A	111529-446116 / 501849-2007394 / 329579-13183	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spect			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	6			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	7/14/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 007
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs:

AA-SLAY-2-138
AA-SLAY-4-140
AA-SLAY-1-FB
AA-SLAY-1-34
AA-SLAY-1-54

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated the MS/MSD had recoveries outside the QC limits.
The narrative also indicated that the CCV had recoveries outside the QC limits, and although it is beyond the scope of this review, it should be noted.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage conditions meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			x

Note:

6.0 Surrogate Recovery (Code S)

				Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?			x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?			x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?					x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: The narrative indicated MS/MSD results outside QC limits; however the MS/MSD sample for this batch was not analyzed with this SDG. No qualification of data was required.

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		x	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
12.2	Number of samples:	5			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.2 x 12.3) - 12.4) / (12.2 x 12.3)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	7/15/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 007
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples required qualification.

Field IDs: AA-SLAY-2-138
AA-SLAY-4-140
AA-SLAY-1-FB
AA-SLAY-1-34
AA-SLAY-1-54

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x										x	
1.4	Does sample preservation, collection and storage meet method requirements? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{o}C \pm 2\ ^{o}C$)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the serial dilution had %RPDs outside the QC limits.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28 days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).	x									x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: All RPD's were within criteria. A sample not associated with this SDG was analyzed as the duplicate sample.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)	x									x		
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: A sample not associated with this SDG was spiked and analyzed with some recoveries outside QC limits. No qualification of data was required.

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).		x										

Note: Sample AA-SLAY-2-138 was diluted and analyzed with %RPDs outside QC limits. However all results were less than 50x the IDL in the original sample; therefore no qualification of data was required.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		x									x	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < + 4 x PQL.)			x									x

Note:

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)							
13.2	Number of samples:	5		0		0		5
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.2 x 13.3) - 13.4) / (13.2 x 13.3)							
	% Completeness	**100**		####		####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	7/14/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 007
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on field blank contamination. Qualifications are listed in the appropriate section below.

Field IDs:

AA-SLAY-2-138
AA-SLAY-4-140
AA-SLAY-1-FB
AA-SLAY-1-34
AA-SLAY-1-54

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: No anomalies were encountered.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?	x		
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: The field blank sample reported ammonia above the MDL; qualifications are listed below.

Field ID	Analyte	Qualification	Code
AA-SLAY-1-34	Ammonia	U	X
AA-SLAY-1-54	Ammonia	U	X

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			x

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: The MS/MSD sample had recoveries outside QC limits. however, the parent sample was not included in this SDG; therefore no qualification of data was required.

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	x		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	x		

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
12.2	Number of samples:	5			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.2 x 12.3) - 12.4) / (12.2 x 12.3)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/10/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS008
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on surrogate and Internal standard recoveries.

Field IDs:

SA-P-3-SS-1.5
SA-P-3-SB-4
SA-P-3-WS-14
SA-P-2-SS-0.5
SA-P-2-SB-5
SA-P-2-WS-9

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the surrogate and LCS recoveries were outside QC limits.
Although it is beyond the scope of this review, it should be noted that the CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?				x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 ^{o}C ±2 ^{o}C	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	x		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: The method blank had positive results for methylene chloride. However, this method blank was not associated with any samples in this SDG.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?				x	
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.					
	> UCL	10% to LCL	< 10%			
	Positive J	J	J			
	Non-detect None	UJ	R			

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Sample ID	Surrogate recoveries	Surrogates	Surrogate Limits
SA-P-3-WS-14	66 / 62	BFB / TOL	68-121 / 65-128
SA-P-3-WS-14RA	64	TOL	65-128
SA-P-2-SS-0.5	0 / 0 / 0	BFB / DBFM / TOL	68-121 / 66-127 / 65-128
SA-P-2-WS-9	51 / 35	DBFM / TOL	66-127 / 65-128
SA-P-2-WS-9RA	49 / 39	DBFM / TOL	66-127 / 65-128

BFB=4-Bromofluorobenzene DBFM=Dibromofluoromethane TOL=Toluene-d8

Sample ID	Analytes	Qualification	Code
SA-P-3-WS-14	All VOCs	J/UJ	S
SA-P-3-WS-14RA	All VOCs	J/UJ	S
SA-P-2-SS-0.5	All VOCs	J/R	S
SA-P-2-WS-9	All VOCs	J/UJ	S
SA-P-2-WS-9RA	All VOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note: Several LCS recoveries were outside QC limits; however, these LCS samples were not associated with samples in this SDG. No qualification of data was required.

10.0 Internal Standards (Code I)

				Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x	
	Area > +100%	Area < -50%	Area < -10%			
	Positive J	J	J			
	Non-detect None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.					
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?			x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.					

Note: Internal standards were outside QC limits. Qualifications are listed below.

Field ID	Analytes	IS Recoveries Low/High	Qualification	Code
SA-P-3-SS-1.5	All VOCs	IS Recoveries Low	J/UJ	I
SA-P-3-SS-1.5RA	All VOCs	IS Recoveries Low	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
14.2	Number of samples:	6			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/5/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS008
		Review Level:	Level III

Major Anomalies:

All reanalyzed samples were rejected due to holding time limits being exceeded.

Minor Anomalies:

Samples were qualified estimated (J/UJ) based on blank contamination and LCS and Internal standard recoveries outside QC limits.

Field IDs:

SA-P-3-SS-1.5	SA-P-3-SB-4	SA-P-3-WS-14
SA-P-2-SS-0.5	SA-P-2-SB-5	SA-P-2-WS-9

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: Samples had to be reanalyzed outside of holding time due to method blank contamination.
The LCS, surrogate, and internal standards had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: All samples were re-extracted 37 days outside of holding time; qualifications are listed below.

Sample ID	Analytes	Qualification	Code
SA-P-3-SS-1.5RA	All SVOC analytes	R	H
SA-P-2-SS-0.5RA	All SVOC analytes	R	H
SA-P-3-SB-4RA	All SVOC analytes	R	H
SA-P-2-SB-5RA	All SVOC analytes	R	H
SA-P-3-WS-14RA	All SVOC analytes	R	H
SA-P-2-WS-9RA	All SVOC analytes	R	H

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: After examination of the blank sample, it appeared that the sample had been inadvertently spiked the LCS sample. This was confirmed with the lab on a phone conversation on 8/8/05. All results will be qualified estimated (J).

Field ID	Analyte	Qualification	Code
SA-P-3-SS-1.5	All detected SVOCs	J	Z
SA-P-3-SB-4	All detected SVOCs	J	Z
SA-P-3-WS-14	All detected SVOCs	J	Z
SA-P-2-SS-0.5	All detected SVOCs	J	Z
SA-P-2-SB-5	All detected SVOCs	J	Z
SA-P-2-WS-9	All detected SVOCs	J	Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?				x	
7.3	Are more than one of either fraction outside the acceptance criteria?			x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?				x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?					x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.					
		> UCL	10% to LCL	< 10%		
	Positive	J	J	J		
	Non-detect	None	UJ	R		

Note: Surrogate recoveries were outside QC limits due to dilutions; therefore, no qualification of data was required.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+) /R(-). RPD failures should be flagged "J" (+ only).			
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note: The LCS had several analytes outside QC limits. Qualifications are listed below.

LCS ID	Analytes	LCS Recoveries	LCS Limits
LCS 680-10560	Acenaphthene	25	36-108
LCS 680-10560	Acenaphtyylene	27	41-112
LCS 680-10560	Anthracene	30	46-115
LCS 680-10560	Benzo(a)anthracene	31	46-116
LCS 680-10560	Benzo(a)pyrene	29	37-120
LCS 680-10560	Benzo(b)fluoranthene	31	35-122
LCS 680-10560	Benzo(g,h,i)perylene	21	41-122
LCS 680-10560	Benzo(k)fluoranthene	32	36-124
LCS 680-10560	Bis(2-chloroethoxy)methane	21	38-106
LCS 680-10560	Bis(2-chloroethyl)ether	17	30-98
LCS 680-10560	4-Bromophenyl phenyl ether	23	38-106
LCS 680-10560	Butyl benzyl phthalate	40	43-127
LCS 680-10560	Carbazole	31	47-118
LCS 680-10560	4-Chloro-3-methylphenol	23	39-113
LCS 680-10560	2-Chloromaphthalene	25	41-110
LCS 680-10560	2-Chlorophenol	20	36-99
LCS 680-10560	4-Chlorophenyl phenyl ether	23	42-111
LCS 680-10560	Chrysene	31	46-118
LCS 680-10560	Dibenz(a,h)anthracene	22	41-124
LCS 680-10560	Dibenzofuran	27	44-108
LCS 680-10560	1,3-Dichlorobenzene	19	34-90
LCS 680-10560	1,2-Dichlorobenzene	19	35-93
LCS 680-10560	1,4-Dichlorobenzene	19	32-90
LCS 680-10560	2,4-Dichlorophenol	22	43-108
LCS 680-10560	Diethyl phthalate	28	41-118
LCS 680-10560	2,4-Dimethylphenol	24	40-112
LCS 680-10560	Dimethyl phthalate	28	43-114
LCS 680-10560	Di-n-butyl phthalate	32	35-93
LCS 680-10560	2,4-Dinitrotoluene	28	32-128
LCS 680-10560	2,6-Dinitrotoluene	28	38-128
LCS 680-10560	Di-n-octyl phthalate	28	43-129
LCS 680-10560	Fluoranthene	28	41-124
LCS 680-10560	Fluorene	26	37-113
LCS 680-10560	Hexachlorobenzene	28	46-115

LCS ID	Analytes	LCS Recoveries	LCS Limits
LCS 680-10560	Hexachlorobutadiene	19	43-105
LCS 680-10560	Hexachlorocyclopentadiene	18	20-109
LCS 680-10560	Hexachloroethane	17	31-88
LCS 680-10560	Indeno[1,2,3-cd]pyrene	18	36-133
LCS 680-10560	Isophorone	21	37-106
LCS 680-10560	2-Methylnaphthalene	22	39-104
LCS 680-10560	2-Methylphenol	22	38-107
LCS 680-10560	3 & 4 Methylphenol	22	37-106
LCS 680-10560	Naphthalene	22	34-97
LCS 680-10560	2-Nitroaniline	25	38-124
LCS 680-10560	4-Nitroaniline	28	32-130
LCS 680-10560	Nitrobenzene	19	33-106
LCS 680-10560	2-Nitrophenol	22	38-104
LCS 680-10560	N-Nitrosodi-n-propylamine	18	24-108
LCS 680-10560	Pentachlorophenol	5	27-116
LCS 680-10560	Phenanthrene	31	47-114
LCS 680-10560	Phenol	21	34-98
LCS 680-10560	1,2,4-Trichlorobenzene	19	36-98
LCS 680-10560	2,4,5-Trichlorophenol	24	46-116
LCS 680-10560	2,4,6-Trichlorophenol	23	44-113
SA-P-3-SS-1.5	All SVOCs	J/UJ	L
SA-P-2-SS-0.5	All SVOCs	J/UJ	L
SA-P-3-SB-4	All SVOCs	J/UJ	L
SA-P-2-SB-5	All SVOCs	J/UJ	L
SA-P-3-WS-14	All SVOCs	J/UJ	L
SA-P-2-WS-9	All SVOCs	J/UJ	L

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
14.2	Number of samples:	6			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/10/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS008
		Review Level:	Level III

Major Anomalies:

All PCB samples were rejected due to holding times outside criteria.

Minor Anomalies:

Samples were qualified based on the LCS.

Field IDs: SA-P-3-SB-4, SA-P-3-WS-14, SA-P-2-SB-5, SA-P-2-WS-9

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that LCS recoveries were outside QC limits
Surrogate recoveries were also outside QC limits due to dilutions.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: All PCB samples were extracted 27 days outside holding time criteria. Qualifications are listed below.

Field IDs:	Analytes	Qualification	Code
SA-P-3-SB-4	All PCBs	R	H
SA-P-3-WS-14	All PCBs	R	H
SA-P-2-SB-5	All PCBs	R	H
SA-P-2-WS-9	All PCBs	R	H

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?		x	
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)	x		
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: The surrogates were diluted out of the samples. No qualification of data was required.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/ R(-). RPD failures should be flagged "J" (+ only).			

Note: The LCS had recoveries outside the QC limits. Qualifications are listed below.

Field ID	Analytes	LCS Limits	LCS Recoveries
SA-P-3-SB-4	All PCBs / Endosulfan II	30-130 / 31-127	All below Limits
SA-P-3-WS-14	All PCBs / Endosulfan II	30-130 / 31-127	All below Limits
SA-P-2-SB-5	All PCBs / Endosulfan II	30-130 / 31-127	All below Limits
SA-P-2-WS-9	All PCBs / Endosulfan II	30-130 / 31-127	All below Limits

Field ID	Analytes	Qualification	Code
SA-P-3-SB-4	All PCBs / Endosulfan II	J/UJ	L
SA-P-3-WS-14	All PCBs / Endosulfan II	J/UJ	L
SA-P-2-SB-5	All PCBs / Endosulfan II	J/UJ	L
SA-P-2-WS-9	All PCBs / Endosulfan II	J/UJ	L

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		x	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
13.2	Number of samples:	1			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/5/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS008
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs:	SA-P-3-SS-1.5	SA-P-3-SB-4	SA-P-3-WS-14
	SA-P-2-SS-0.5	SA-P-2-SB-5	SA-P-2-WS-9

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: Although it is beyond the scope of this review, it should be noted that the ICAL and CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage conditions meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			x

Note:

6.0 Surrogate Recovery (Code S)

		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?			x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL / 10% to LCL / < 10%			
	Positive: J / J / J			
	Non-detect: None / UJ / R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J"(+ only).			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		x	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
12.2	Number of samples:	6			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported: % Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)	0			
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/10/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS008
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on holding times and blank contamination.

Field IDs:

SA-P-3-SS-1.5
SA-P-3-SB-4
SA-P-3-WS-14
SA-P-2-SS-0.5
SA-P-2-SB-5
SA-P-2-WS-9

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x									x		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{o}C \pm 2\ ^{o}C$)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the samples were analyzed outside holding times for mercury.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x								x		
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note: All samples were analyzed outside holding times for mercury. Qualifications are listed below.

Field ID	Analytes	Qualification	Code	Late
SA-P-3-SS-1.5	Mercury	J	H	1
SA-P-3-SB-4	Mercury	J	H	1
SA-P-3-WS-14	Mercury	J	H	1
SA-P-2-SS-0.5	Mercury	J	H	1
SA-P-2-SB-5	Mercury	J	H	1
SA-P-2-WS-9	Mercury	J	H	1

3.0 Instrument Calibration (Code C)

						ICP			ICP-MS			GFAA			CVAA-Hg		
						Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)							x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).																x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.							x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.							x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).							x									x
	Action:		R(+/-)	J(+)/UJ(-)	J(+)	R(+)											
		Mercury	< 65%	65% - 79%	121% - 135%	> 135%											
		Other Metals	< 75%	75% - 89%	111% - 125%	> 125%											

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL. Qualifications are listed below.

Field ID	Analytes	Qualification	Code	New RL
SA-P-3-SS-1.5	Sodium	U	P	360
SA-P-2-SB-5	Sodium	U	P	380

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x						x			
5.2	Are the ICS AB recoveries within 80% - 120%?			x						x			
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x						x			
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x						x			
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	X									X		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		X									X	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	X									X		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		X									X	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ±2 X PQL for solids) Action: If no, J(+).	X									X		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note:

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	X									X		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		X									X	
8.3	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration> 4 x spike concentration.)	X									X		
	%R > 125% / 30% < %R < 74% / %R < 30%												
	Positive: J / J / J												
	Non-detect: None / UJ / R												

Note: Sample SA-P-3-SB-4 was spiked and analyzed as the MS/MSD.

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration> 50 x the IDL in the original sample? If no, J(+).	x											

Note:

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		x									x	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ±2 x PQL and for solids, RPD < 100% or difference < ±4 x PQL)			x									x

Note:

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)								
13.2	Number of samples:	6		0		0		6	
13.3	Number of target compounds in each analysis:	22		0		0		1	
13.4	Number of results rejected and not reported:	0		0		0		0	
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)								
	% Completeness	**100**		**####**		**####**		**100**	

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/5/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS008
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:	SA-P-3-SS-1.5	SA-P-3-SB-4	SA-P-3-WS-14
	SA-P-2-SS-0.5	SA-P-2-SB-5	SA-P-2-WS-9

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			x

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: Sample SA-P-3-SB-4 was spiked and analyzed as the MS/MSD.

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only).			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		x	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x		
12.2	Number of samples:	6			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Achintya Bezbaruah	**Project Name:**	Sauget - Area 2
Date:	8/1/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS009
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No analytes required qualification, based on this data review.

Field IDs:

AA-Q-9-132	AA-Q-9-FB	AA-Q-9-118
AA-CLAY-1-26	AA-Q-9-38	AA-SLAY-1-74
AA-CLAY-1-46	AA-Q-9-58	AA-SLAY-1-94
AA-O-4-42	AA-Q-9-78	AA-SLAY-1-114
AA-O-4-62	AA-Q-9-78-D	AA-SLAY-1-132
AA-O-4-82	AA-Q-9-98	TB-9

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: No anomalies were noted in the case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix / Preserved / Aromatic / All others			
	Aqueous / No / 7 days / 14 days			
	Yes / 14 days / 14 days			
	Soil/Sediment / 4 $^{o}C \pm 2\ ^{o}C$ / 14 days / 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: For sample AA-Q-9-78 a field duplicate (AA-Q-9-78-D) was collected.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	18			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Achintya Bezbaruah	**Project Name:**	Sauget - Area 2
Date:	8/1/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 009
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on LCS recoveries.

Field IDs:

AA-Q-9-132	AA-Q-9-FB	AA-Q-9-118
AA-CLAY-1-26	AA-Q-9-38	AA-SLAY-1-74
AA-CLAY-1-46	AA-Q-9-58	AA-SLAY-1-94
AA-O-4-42	AA-Q-9-78	AA-SLAY-1-114
AA-O-4-62	AA-Q-9-78-D	AA-SLAY-1-132
AA-O-4-82	AA-Q-9-98	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: Surrogates for some samples were recovered outside of QC limits.

LCS recoveries for some samples were outside of QC limits.

The narrative also indicated analytical results for some samples were reported from diluted analyses due to elevated levels of target compounds exceeding the linear range.

The SVOC internal standard Perylene-d12 was recovered outside of QC limits in one sample.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?	x		
7.3	Are more than one of either fraction outside the acceptance criteria?		x	
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?			x
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Surrogates in sample AA-O-4-62 (run #2) were diluted out. - No qualification of data was required.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note: LCS recoveries for 4-Chloroaniline and 3,3-Dichlorobenzidine were outside QC limits. See the table below for qualifications:

Analyte	Recovery	Criteria
4-Chloroaniline	18%	22-107%
3,3-Dichlorobenzidine	2%	29-101%

Field ID	Analyte	Qualification	Code
AA-SLAY-1-114	4-Chloroaniline	**J**	L
AA-Q-9-132	4-Chloroaniline	**UJ**	L
AA-CLAY-1-26	4-Chloroaniline	**UJ**	L
AA-CLAY-1-46	4-Chloroaniline	**UJ**	L
AA-O-4-42	4-Chloroaniline	**UJ**	L
AA-O-4-62	4-Chloroaniline	**UJ**	L
AA-O-4-82	4-Chloroaniline	**UJ**	L
AA-Q-9-FB	4-Chloroaniline	**UJ**	L
AA-Q-9-38	4-Chloroaniline	**UJ**	L
AA-Q-9-58	4-Chloroaniline	**UJ**	L
AA-Q-9-78	4-Chloroaniline	**UJ**	L
AA-Q-9-78-D	4-Chloroaniline	**UJ**	L
AA-Q-9-98	4-Chloroaniline	**UJ**	L
AA-Q-9-118	4-Chloroaniline	**UJ**	L
AA-SLAY-1-74	4-Chloroaniline	**UJ**	L
AA-SLAY-1-94	4-Chloroaniline	**UJ**	L
AA-SLAY-1-132	4-Chloroaniline	**UJ**	L

Field ID	Analyte	Qualification	Code
AA-Q-9-132	3,3-Dichlorobenzidine	UJ	L
AA-CLAY-1-26	3,3-Dichlorobenzidine	UJ	L
AA-CLAY-1-46	3,3-Dichlorobenzidine	UJ	L
AA-O-4-42	3,3-Dichlorobenzidine	UJ	L
AA-O-4-62	3,3-Dichlorobenzidine	UJ	L
AA-O-4-82	3,3-Dichlorobenzidine	UJ	L
AA-Q-9-FB	3,3-Dichlorobenzidine	UJ	L
AA-Q-9-38	3,3-Dichlorobenzidine	UJ	L
AA-Q-9-58	3,3-Dichlorobenzidine	UJ	L
AA-Q-9-78	3,3-Dichlorobenzidine	UJ	L
AA-Q-9-78-D	3,3-Dichlorobenzidine	UJ	L
AA-Q-9-98	3,3-Dichlorobenzidine	UJ	L
AA-Q-9-118	3,3-Dichlorobenzidine	UJ	L
AA-SLAY-1-74	3,3-Dichlorobenzidine	UJ	L
AA-SLAY-1-94	3,3-Dichlorobenzidine	UJ	L
AA-SLAY-1-114	3,3-Dichlorobenzidine	UJ	L
AA-SLAY-1-132	3,3-Dichlorobenzidine	UJ	L

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?					x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: The recovery of Perylene-d12 in sample AA-SLAY-1-132 was below QC criteria.

Field ID	Analyte	Qualification	Code
AA-SLAY-1-132	All SVOCs	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples AA-Q-9-78 and AA-Q-9-78-D are a parent /duplicate pair.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	17			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Achintya Bezbaruah	**Project Name:**	Sauget - Area 2
Date:	8/1/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 009
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs:

AA-Q-9-132	AA-Q-9-FB	AA-Q-9-118
AA-CLAY-1-26	AA-Q-9-38	AA-SLAY-1-74
AA-CLAY-1-46	AA-Q-9-58	AA-SLAY-1-94
AA-O-4-42	AA-Q-9-78	AA-SLAY-1-114
AA-O-4-62	AA-Q-9-78-D	AA-SLAY-1-132
AA-O-4-82	AA-Q-9-98	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The narrative indicated that the CCV had recoveries outside the QC limits, however, it is beyond the scope of this review, but it should be noted.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?						x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?		x	
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples AA-Q-9-78 and AA-Q-9-78-D are a parent /duplicate pair.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	17			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.2 x 12.3) - 12.4) / (12.2 x 12.3)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review
Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Achintya Bezbaruah	**Project Name:**	Sauget - Area 2
Date:	8/1/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 009
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification

Field IDs:

AA-Q-9-132	AA-Q-9-FB	AA-Q-9-118
AA-CLAY-1-26	AA-Q-9-38	AA-SLAY-1-74
AA-CLAY-1-46	AA-Q-9-58	AA-SLAY-1-94
AA-O-4-42	AA-Q-9-78	AA-SLAY-1-114
AA-O-4-62	AA-Q-9-78-D	AA-SLAY-1-132
AA-O-4-82	AA-Q-9-98	

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x									x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C ± 2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the serial dilution had %Ds outside the QC limits.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28 days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code C)

						ICP			ICP-MS			GFAA			CVAA-Hg		
						Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)							x									x
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).																x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.							x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.							x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).							x									x
	Action:		R(+/-)	J(+)/UJ(-)	J(+)	R(+)											
		Mercury	< 65%	65% - 79%	121% - 135%	> 135%											
		Other Metals	< 75%	75% - 89%	111% - 125%	> 125%											

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		x									x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		x									x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL in the method blank; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ±2 X PQL for solids) Action: If no, J(+).	x									x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note:

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)	x									x		
	%R > 125% / 30% < %R < 74% / %R < 30%												
	Positive: J / J / J												
	Non-detect: None / UJ / R												

Note: Sample AA-Q-9-38 was spiked and analyzed

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note:

11.0 Field Duplicate Samples (Code F)

			ICP		ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < +2 x PQL and for solids, RPD < 100% or difference < +4 x PQL)	x									x		

Note: Samples AA-Q-9-78 and AA-Q-9-78-D are a parent /duplicate pair.

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	17		0		0		17
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.2 x 13.3) - 13.4) / (13.2 x 13.3)							
	% Completeness	**100**		####		####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Achintya Bezbaruah	**Project Name:**	Sauget - Area 2
Date:	8/1/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 009
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected

Minor Anomalies:

One sample required qualification based on MS/MSD recoveries.

Field IDs:

AA-Q-9-132	AA-Q-9-FB	AA-Q-9-118
AA-CLAY-1-26	AA-Q-9-38	AA-SLAY-1-74
AA-CLAY-1-46	AA-Q-9-58	AA-SLAY-1-94
AA-O-4-42	AA-Q-9-78	AA-SLAY-1-114
AA-O-4-62	AA-Q-9-78-D	AA-SLAY-1-132
AA-O-4-82	AA-Q-9-98	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: No anomalies were encountered.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			x

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample AA-Q-9-132 was spiked and analyzed. Ammonia had a recovery below criteria. Qualifications are listed below.

Analyte	Recovery	Criteria
Ammonia	53/53	90-110

Field ID	Analyte	Qualification	Code
AA-Q-9-132	Ammonia	J	M

7.0 Laboratory Control Sample (LCS/LCSD) (Code l - LCS recovery Code e - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?	x		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples AA-Q-9-78 and AA-Q-9-78-D are a parent /duplicate pair.

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	x		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	x		

Note: Sample AA-SLAY-1-132 was duplicated and analyzed.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	17			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.2 x 12.3) - 12.4) / (12.2 x 12.3)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/25/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 010
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on internal standard and surrogate recoveries.

Field IDs:	AT-Q-21-SB-6	AT-Q-21-WS-8	AT-Q-21-WS-8-D
	SA-S-2-SS-1.5	SA-S-2-SB-4	SA-S-1-SS-0.5
	SA-S-1-SB-5	SA-S-1-WS-9	AT-Q-20-SB-6
	AT-Q-20-SS-1	SA-Q-1-SS-1	SA-Q-1-SB-6
	SA-Q-8-SS-0.5	SA-Q-8-SB-5	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that MS/MSD, LCS, and internal standards were recovered outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix / Preserved / Aromatic / All others			
	Aqueous / No / 7 days / 14 days			
	Yes / 14 days / 14 days			
	Soil/Sediment / 4 ^{o}C $\pm$2 ^{o}C / 14 days / 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination).

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?		x	
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			

		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note: Surrogate recoveries were outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate recoveries	Surrogate Limits
AT-Q-20-SB-6	4-Bromofluorobenzene	64	68-121
SA-Q-1-SS-1	4-Bromofluorobenzene	43	68-121

Field ID	Analyte	Qualification	Code
AT-Q-20-SB-6	All VOCs	J/UJ	S
SA-Q-1-SS-1	All VOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample AT-Q-20-SB-6 was used as the MS/MSD sample. The MS/MSD had several analytes outside QC limits. All LCS samples associated with this MS/MSD were within QC limits. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: LCS recoveries were above QC limits. The associated samples were non-detect for the analytes that recovered above the QC limits in the LCS. No qualification of data was required.

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?					x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: Several internal standards were outside QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Internal standards High/Low	Code
AT-Q-20-SB-6	All VOCs	J/UJ	Low	I
SA-Q-1-SS-1	All VOCs	J/UJ	Low	I
SA-Q-1-SB-6	All VOCs	J/UJ	Low	I
SA-Q-1-SS-1RA	All VOCs	J/UJ	Low	I
SA-Q-1-SB-6RA	All VOCs	J/UJ	Low	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-21-WS-8 was the parent sample to AT-Q-21-WS-8-D.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	14			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/25/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 010
		Review Level:	Level III

Major Anomalies:

Samples were rejected based on hold time criteria.

Minor Anomalies:

Samples were qualified based on surrogate and internal standard recoveries.

Field IDs:

AT-Q-21-SB-6	AT-Q-21-WS-8	AT-Q-21-WS-8-D
SA-S-2-SS-1.5	SA-S-2-SB-4	SA-S-1-SS-0.5
SA-S-1-SB-5	SA-S-1-WS-9	AT-Q-20-SB-6
AT-Q-20-SS-1	SA-Q-1-SS-1	SA-Q-1-SB-6
SA-Q-8-SS-0.5	SA-Q-8-SB-5	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: Samples had to be reanalyzed outside of holding time due to surrogates outside QC limits.
The LCS had recoveries outside QC limits.
Surrogate analytes had recoveries outside QC limits

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: Several samples were re-extracted outside holding times. Qualifications are listed below.

Field ID	Analyte	Days Late	Qualification	Code
AT-Q-21-SB-6RE	All SVOCs	34	R	H
AT-Q-21-WS-8RE	All SVOCs	34	R	H
AT-Q-21-WS-8REDL	All SVOCs	34	R	H
AT-Q-21-WS-8-DRE	All SVOCs	34	R	H
SA-S-2-SS-1.5RE	All SVOCs	34	R	H
SA-S-2-SB-4RE	All SVOCs	34	R	H
SA-S-2-SB-4REDL	All SVOCs	34	R	H
SA-S-1-SS-0.5RE	All SVOCs	34	R	H
SA-S-1-SB-5RE	All SVOCs	34	R	H
SA-S-1-SB-5REDL	All SVOCs	34	R	H
SA-S-1-WS-9RE	All SVOCs	34	R	H
AT-Q-20-SB-6RE	All SVOCs	34	R	H
AT-Q-20-SS-1RE	All SVOCs	34	R	H
SA-Q-1-SS-1RE	All SVOCs	34	R	H
SA-Q-1-SB-6RE	All SVOCs	34	R	H
SA-Q-8-SS-0.5RE	All SVOCs	34	R	H
SA-Q-8-SB-5RE	All SVOCs	34	R	H
SA-Q-8-SB-5REDL	All SVOCs	34	R	H

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	x		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: Several analytes in the method blank were detected above the MDL. The blank sample was associated with the reanalyzed samples which were previously rejected. No qualification of data was required.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?		x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			

	> UCL	10% to LCL	< 10%
Positive	J	J	J
Non-detect	None	UJ	R

Note: Several surrogate analytes were outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-S-2-SS-1.5	2FP, FBP, NBZ, PHL	21, 26, 0, 21	36-101 / 38-104 / 33-94 / 38-102
SA-S-2-SS-1.5RE	TBP	13	27-124
SA-S-2-SB-4	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101 / 38-104 / 33-94 / 38-102 / 27-124 / 40-129
SA-S-1-SS-0.5	2FP, FBP, NBZ, PHL	21, 26, 0, 23	36-101 / 38-104 / 33-94 / 38-102
SA-S-1-SS-0.5RE	TBP	0	27-124
SA-S-1-SB-5	NBZ	95	33-94
SA-S-1-SB-5RE	2FP, PHL	31, 37	36-101 / 38-102
SA-S-1-WS-9	2FP, FBP, NBZ, PHL	32, 37, 29, 35	36-101 / 38-104 / 33-94 / 38-102
SA-S-1-WS-9RE	TBP	0	27-124
AT-Q-20-SB-6	2FP, FBP, NBZ, PHL	19, 26, 0, 21	36-101 / 38-104 / 33-94 / 38-102
AT-Q-20-SB-6RE	TBP	0	27-124
AT-Q-20-SS-1	2FP, FBP, NBZ, PHL	26, 34, 0, 25	36-101 / 38-104 / 33-94 / 38-102
AT-Q-20-SS-1RE	TBP	0	27-124
SA-Q-1-SS-1	2FP, FBP, NBZ, PHL	20, 28, 0, 22	36-101 / 38-104 / 33-94 / 38-102
SA-Q-1-SS-1RE	2FP, PHL, TBP	30, 36, 13	36-101 / 38-102 / 27-124
SA-Q-1-SB-6	2FP, FBP, NBZ, PHL	18, 27, 0, 19	36-101 / 38-104 / 33-94 / 38-102
SA-Q-1-SB-6RE	TBP	20	27-124
SA-Q-8-SS-0.5	2FP, FBP, NBZ, PHL	18, 22, 0, 18	36-101 / 38-104 / 33-94 / 38-102
SA-Q-8-SB-5	2FP, FBP, NBZ, PHL	15, 23, 0, 17	36-101 / 38-104 / 33-94 / 38-102

2FP=2-Fluorophenol, FBP=2-Fluorobiphenyl, NBZ=Nitrobenzene-d5, PHL=Phenol-d5, TBP=2,4,6-Tribromophenol, TPH=Terphenyl-d14

Field ID	Analyte	Qualification	Code
SA-S-2-SS-1.5	All SVOCs	J/UJ	S
SA-S-2-SB-4	All SVOCs	J/R	S
SA-S-1-SS-0.5	All SVOCs	J/UJ	S
SA-S-1-WS-9	All SVOCs	J/UJ	S
AT-Q-20-SB-6	All SVOCs	J/UJ	S
AT-Q-20-SS-1	All SVOCs	J/UJ	S
SA-Q-1-SS-1	All SVOCs	J/UJ	S
SA-Q-1-SB-6	All SVOCs	J/UJ	S
SA-Q-8-SS-0.5	All SVOCs	J/UJ	S
SA-Q-8-SB-5	All SVOCs	J/UJ	s

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Several analytes were outside QC limits for the MS/MSD sample AT-Q-20-SB-6, however the LCS was within QC limits. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note: The LCS that had recoveries outside QC limits is associated with the reanalyzed samples. These samples were previously rejected, and do not require further qualification.

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?					x	
		Area > +100%		Area < -50%	Area < -10%			
	Positive	J		J	J			
	Non-detect	None		UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: Several internal standards were outside QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Internal Standard High/Low	Code
SA-S-2-SB-4DL	All SVOCs	J/UJ	Low	I
SA-S-1-WS-9	All detected SVOCs	J	High	I
AT-Q-20-SB-6	All detected SVOCs	J	High	I
SA-Q-1-SB-6	All detected SVOCs	J	High	I
SA-Q-8-SS-0.5	All detected SVOCs	J	High	I
SA-Q-8-SB-5	All detected SVOCs	J	High	I
AT-Q-21-SB-6	All detected SVOCs	J	High	I
AT-Q-21-WS-8	All detected SVOCs	J	High	I
SA-S-2-SB-4	All detected SVOCs	J	High	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-21-WS-8 was the parent sample for AT-Q-21-WS-8-D

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	14			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/30/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 010
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on surrogate, LCS, and MS/MSD recoveries.

Field IDs:	AT-Q-21-SB-6	AT-Q-21-WS-8	AT-Q-21-WS-8-D
	SA-S-2-SB-4	SA-S-1-WS-9	AT-Q-20-SB-6
	SA-Q-1-SB-6	SA-Q-8-SS-0.5	SA-Q-8-SB-5

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS, MS/MSD, and surrogate recoveries were outside QC limits
Although it is beyond the scope of this review, it should be noted that the CCV and ICAL had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?		x	
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)	x		
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Several samples had the surrogate concentrations diluted out, several others had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	Surrogate recoveries	Surrogate Limits
SA-S-2-SB-4	All Pesticides	225 / 58	30-150 / 30-150
SA-Q-1-SB-6	All Pesticides	307 / 126	30-150 / 30-150
SA-Q-8-SB-5	All Pesticides	283 / 37	30-150 / 30-150

Field ID	Analyte	Qualification	Code
SA-S-2-SB-4	All Detected Pesticides	J	S
SA-Q-1-SB-6	All Detected Pesticides	J	S
SA-Q-8-SB-5	All Detected Pesticides	J	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample AT-Q-20-SB-6 was used as the MS/MSD sample. Several MS/MSD recoveries were outside QC limits for PCB analysis. The pesticide analysis had several analytes outside QC limits; however, all other QC was within criteria. Qualifications for PCB samples are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
AT-Q-20-SB-6	All PCBs	Low	30-130

Field ID	Analyte	Qualification	Code
AT-Q-20-SB-6	All PCBs	J/UJ	M

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries outside the QC limits. Qualifications are listed below.

Field ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-10717	All PCBs	Low	30-130

Field ID	Analyte	Qualification	Code
AT-Q-21-SB-6	All PCBs	J/UJ	L
SA-S-2-SB-4	All PCBs	J/UJ	L
SA-Q-1-SB-6	All PCBs	J/UJ	L
AT-Q-21-WS-8	All PCBs	J/UJ	L
SA-S-1-WS-9	All PCBs	J/UJ	L
SA-Q-8-SS-0.5	All PCBs	J/UJ	L
AT-Q-21-WS-8-D	All PCBs	J/UJ	L
AT-Q-20-SB-6*	All PCBs	J/UJ	L
SA-Q-8-SB-5	All PCBs	J/UJ	L

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?	x		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-21-WS-8-D was analyzed as the duplicate for AT-Q-21-WS-8.

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	9			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/30/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 010
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on the LCS and MS/MSD.

Field IDs:	AT-Q-21-SB-6	AT-Q-21-WS-8	AT-Q-21-WS-8-D
	SA-S-2-SS-1.5	SA-S-2-SB-4	SA-S-1-SS-0.5
	SA-S-1-SB-5	SA-S-1-WS-9	AT-Q-20-SB-6
	AT-Q-20-SS-1	SA-Q-1-SS-1	SA-Q-1-SB-6
	SA-Q-8-SS-0.5	SA-Q-8-SB-5	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS and MS/MSD recoveries were outside the QC limits.
Although it is beyond the scope of this review, it should be noted that the ICAL and CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?					x	
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?						x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)				x		
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note: Several surrogate recoveries were outside QC limits due to dilutions. No qualification of data was required.

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample AT-Q-20-SB-6 was analyzed as the MS/MSD. The MS/MSD sample had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
AT-Q-20-SB-6	Pentachlorophenol	-56 / -80	71-109

Field ID	Analyte	Qualification	Code
AT-Q-20-SB-6	Pentachlorophenol	J	M

8.0 Laboratory Control Sample (LCS/LCSD) (Code L- LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

LCS ID	Analyte	LCS/LCSD Recoveries	LCS/LCSD Limits
LCS 680-11350	Dichloroprop	76 / 110	48-96
LCS 680-11350	Pentachlorophenol	89 / 385	71-109

Field ID	Analyte	Qualification	Code
AT-Q-21-SB-6	Pentachlorophenol	J	L
AT-Q-21-WS-8	Pentachlorophenol	J	L
AT-Q-21-WS-8-D	Pentachlorophenol	J	L
SA-S-2-SB-4	Pentachlorophenol	J	L
SA-S-1-SS-0.5	Pentachlorophenol	J	L
SA-S-1-SB-5	Pentachlorophenol	J	L
SA-S-1-WS-9	Pentachlorophenol	J	L
AT-Q-20-SB-6*	Pentachlorophenol	J	L
SA-Q-1-SS-1	Pentachlorophenol	J	L
SA-Q-1-SB-6	Pentachlorophenol	J	L
SA-Q-8-SS-0.5	Pentachlorophenol	J	L
SA-Q-8-SB-5	Pentachlorophenol	J	L

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-21-WS-8-D was analyzed as the duplicate for AT-Q-21-WS-8.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	6			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review
Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/30/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 010
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries, hold time criteria, and field duplicate RPDs.

Field IDs:

AT-Q-21-SB-6	AT-Q-21-WS-8	AT-Q-21-WS-8-D
SA-S-2-SS-1.5	SA-S-2-SB-4	SA-S-1-SS-0.5
SA-S-1-SB-5	SA-S-1-WS-9	AT-Q-20-SB-6
AT-Q-20-SS-1	SA-Q-1-SS-1	SA-Q-1-SB-6
SA-Q-8-SS-0.5	SA-Q-8-SB-5	

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x									x		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C ± 2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

The narrative also indicated that holding times had been exceeded for mercury.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x								x		
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note: One mercury sample exceeded method holding times. Qualifications are listed below.

Field ID	Analyte	Days late	Qualification	Code
AT-Q-21-SB-6	Mercury	3	J	H

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X- Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		x									x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		x									x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note:

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid: < LCL J(+)/UJ(-); > UCL J(+); Aqueous: < 50% R(+/-); 50% - 79% J(+)/UJ(-); > 120% J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).	x									x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Sample AT-Q-20-SB-6 was analyzed as the laboratory duplicate sample

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)	x									x		
	%R > 125% / 30% < %R < 74% / %R < 30%												
	Positive: J / J / J												
	Non-detect: None / UJ / R												

Note: Sample AT-Q-20-SB-6 was analyzed as the MS/MSD sample. Several recoveries were outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
AT-Q-20-SB-6	Antimony	51 / 53	75-125
AT-Q-20-SB-6	Copper	164 / 257	75-125
AT-Q-20-SB-6	Magnesium	129 / 143	75-125
AT-Q-20-SB-6	Potassium	155 / 175	75-125
AT-Q-20-SB-6	Zinc	122 / 166	75-125
AT-Q-20-SB-6	Mercury	166 / 86	80-120

Field ID	Analyte	Qualification	Code
AT-Q-20-SB-6	Copper	J	M
AT-Q-20-SB-6	Magnesium	J	M
AT-Q-20-SB-6	Potassium	J	M
AT-Q-20-SB-6	Zinc	J	M
AT-Q-20-SB-6	Mercury	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Sample AT-Q-20-SB-6 was analyzed as the serial dilution sample.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < + 4 x PQL)		x								x		

Note: Sample AT-Q-21-WS-8-D was analyzed as the duplicate for AT-Q-21-WS-8. One analyte was outside QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
AT-Q-21-WS-8	Calcium	J	F
AT-Q-21-WS-8-D	Calcium	J	F

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	14		0		0		14
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		#####		#####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/30/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 010
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries

Field IDs:	AT-Q-21-SB-6	AT-Q-21-WS-8	AT-Q-21-WS-8-D
	SA-S-2-SS-1.5	SA-S-2-SB-4	SA-S-1-SS-0.5
	SA-S-1-SB-5	SA-S-1-WS-9	AT-Q-20-SB-6
	AT-Q-20-SS-1	SA-Q-1-SS-1	SA-Q-1-SB-6
	SA-Q-8-SS-0.5	SA-Q-8-SB-5	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample AT-Q-20-SB-6 was spiked and analyzed as the MS/MSD. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
AT-Q-20-SB-6	Ammonia	75/73 / 3	75-125 / 30

Field ID	Analyte	Qualification	Code
AT-Q-20-SB-6	Ammonia	UJ	M

7.0 Laboratory Control Sample (LCS/LCSD) (Code l - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-21-WS-8-D was submitted and analyzed as the field duplicate sample for AT-Q-21-WS-8.

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		x	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	14			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/19/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 011
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No analytes required qualification, based on this data review.

Field IDs:

AA-CLAY-1-66	AA-CLAY-1-86	AA-0-4-102
AA-0-4-119	AA-CLAY-1-106	AA-CLAY-1-119
AA-P-4-22	AA-P-4-42	AA-P-4-62
AA-P-4-62-D	TB-11	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: No anomalies were noted in the case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?				x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 $^{O}C \pm 2\ ^{O}C$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			
	> UCL / 10% to LCL / < 10%			
	Positive: J / J / J			
	Non-detect: None / UJ / R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample AA-0-4-119 was used as the MS/MSD sample.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AA-P-4-62 was the parent sample to AA-P-4-62-D

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	11			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/19/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 011
		Review Level:	Level III

Major Anomalies:

Samples were rejected based on holding times.

Minor Anomalies:

Samples were qualified based on internal standard and surrogate recoveries.

Field IDs:

AA-CLAY-1-66	AA-CLAY-1-86	AA-0-4-102
AA-O-4-119	AA-CLAY-1-106	AA-CLAY-1-119
AA-P-4-22	AA-P-4-42	AA-P-4-62
AA-P-4-62-D		

1.0 Chain of Custody/Sample Condition		**Yes**	**No**	**NA**
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The MS/MSD, internal standards, and surrogates had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: Samples were re-extracted outside holding time criteria.

Field ID	Analyte	Days outside Hold time	Qualification	Code
AA-CLAY-1-86RE	All SVOC Analytes	25	R	H
AA-CLAY-1-86REDL	All SVOC Analytes	25	R	H
AA-0-4-102RE	All SVOC Analytes	25	R	H
AA-0-4-102REDL	All SVOC Analytes	25	R	H
AA-P-4-22RE	All SVOC Analytes	25	R	H
AA-P-4-42RE	All SVOC Analytes	25	R	H
AA-P-4-62RE	All SVOC Analytes	25	R	H

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	x		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: One analyte was detected in the method blank; however, all associated samples were non-detect for that analyte. No qualification of data was required.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?		x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Several surrogate recoveries were outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate limits
AA-CLAY-1-86	2FP	221	56-100
AA-0-4-102	2FP, FBP, NBZ, PHL, TBP	42, 43, 45, 42, 47	56-100, 59-103, 60-102, 55-104, 55-126
AA-0-4-119	2FP	167	56-100
AA-P-4-22	2FP, FBP, NBZ, PHL	22, 54, 52, 12	56-100, 59-103, 60-102, 55-104
AA-P-4-42	2FP, FBP, NBZ, PHL	22, 56, 51, 12	56-100, 59-103, 60-102, 55-104
AA-P-4-62	2FP, FBP, NBZ, PHL	18, 43, 42, 10	56-100, 59-103, 60-102, 55-104
AA-P-4-62-D	2FP, PHL	53, 43	56-100, 55-104

2FP=2-Fluorophenol, FBP=2-Fluorobiphenyl, NBZ=Nitrobenzene-d5, PHL=Phenol-d5, TBP=2,4,6-Tribromophenol

Field ID	Analyte	Qualification	Code
AA-0-4-102	All SVOCs	J/UJ	S
AA-P-4-22	All SVOCs	J/UJ	S
AA-P-4-42	All SVOCs	J/UJ	S
AA-P-4-62	All SVOCs	J/UJ	S
AA-P-4-62-D	All Acid fraction analytes	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample AA-0-4-119 was used as the MS/MSD sample. Several analytes were outside QC limits for the MS/MSD sample, however the LCS was within QC limits. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?					x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: One sample had several internal standards outside QC limits. Qualifications are listed below.

Field ID	Analyte	IS Recoveries High/Low	Qualifications	Code
AA-CLAY-1-86	All SVOCs	Low	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AA-P-4-62 was the parent sample for AA-P-4-62-D

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	10			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/19/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 011
		Review Level:	Level III

Major Anomalies:

No samples were rejected .

Minor Anomalies:

Samples were qualified based on field duplicate differences.

Field IDs:

AA-CLAY-1-66	AA-CLAY-1-86	AA-0-4-102
AA-0-4-119	AA-CLAY-1-106	AA-CLAY-1-119
AA-P-4-22	AA-P-4-42	AA-P-4-62
AA-P-4-62-D		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative and cooler receipt form indicated no problems.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			x

Note:

6.0 Surrogate Recovery (Code S)

				Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?			x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?					x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		x	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AA-P-4-62 was the parent sample for AA-P-4-62-D. The sample and duplicate sample had %RPD outside QC limits for one analyte. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
AA-P-4-62	MCPP	J	F
AA-P-4-62-D	MCPP	J	F

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	10			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review
Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/19/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 011
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification

Field IDs:

AA-CLAY-1-66	AA-CLAY-1-86	AA-0-4-102
AA-0-4-119	AA-CLAY-1-106	AA-CLAY-1-119
AA-P-4-22	AA-P-4-42	AA-P-4-62
AA-P-4-62D		

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x									x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{o}C \pm 2\ ^{o}C$)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative and cooler receipt form indicated no discrepancies.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		x									x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note:

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).	x									x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Sample AA-0-4-119 was used as the laboratory duplicate.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)	x									x		
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: Sample AA-0-4-119 was used as the MS/MSD sample.

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Sample AA-0-4-119 was diluted and analyzed as the serial dilution sample.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)	x									x		

Note: Sample AA-P-4-62 was the parent sample for AA-P-4-62-D.

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	10		0		0		10
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		####		####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/19/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 011
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries.

Field IDs:

AA-CLAY-1-66	AA-CLAY-1-86	AA-0-4-102
AA-0-4-119	AA-CLAY-1-106	AA-CLAY-1-119
AA-P-4-22	AA-P-4-42	AA-P-4-62
AA-P-4-62-D		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?	x		
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: The method blank sample was reported above the MDL; however, all associated samples were greater than 5X the blank concentration. No qualification of data was required.

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			x

Note: Sample AA-0-119 was used as the MS/MSD sample.

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD sample had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD recoveries	MS/MSD limits
AA-0-4-119	Ammonia	42/41 / 1	90-110 / 30

Field ID	Analyte	Qualification	Code
AA-0-4-119	Ammonia	J	m

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?	x		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AA-P-4-62 was the parent sample to AA-P-4-62-D

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.			x
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	10			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Amelia Turnell	**Project Name:**	Sauget - Area 2
Date:	10/10/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 012
		Review Level:	Level III

Major Anomalies:

Analytes were rejected as mentioned below.

Minor Anomalies:

Samples required qualifications.

Field IDs:

SA-Q-15-SS-0.5	SA-Q-13-SB-2	SA-Q-11-SS-0.5
SA-Q-15-SB-2	AT-Q-21-SS-1	SA-Q-11-SB-2
SA-Q-14-SS-0.5	AT-Q-21-SS-1-D	SA-Q-9-SS-0.5
SA-Q-14-SB-5	AT-Q-19-SB-6	SA-Q-9-SB-5
SA-Q-13-SS-1	AT-Q-19-SB-6-D	SA-Q-9-SB-5-D
SA-Q-10-SB-2	SA-Q-10-SS-0.5-D	SA-Q-10-SS-0.5

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note: The laboratory case narrative indicated that a few hold times were exceeded for confirmation of results. A few surrogates and a few MS/MSD recoveries were outside control limits. One compound in one LCS was recovered low. Multiple internal standards were recovered low outside quality control limits for various samples. One sample was analyzed at a secondary dilution due to abundance of target analytes. Although it is beyond the scope of this review, it should be noted that the CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).	x		
	Matrix / Preserved / Aromatic / All others			
	Aqueous / No / 7 days / 14 days			
	Yes / 14 days / 14 days			
	Soil/Sediment / 4 °C + 2 °C / 14 days / 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note: Samples AT-Q-21-SS-1 RA, AT-Q-21-SS-1-D RA, AT-Q-19-SB-6 RA and AT-Q-19-SB-6-D RA were reanalyzed outside holding times. Qualifications are listed below.

Days Late	Field ID	Analyte	Qualification	Code
4	AT-Q-21-SS-1 RA	All VOCs	detects J/ non-detects UJ	H
4	AT-Q-21-SS-1-D RA	All VOCs	only non-detects, therefore, only UJ	H
4	AT-Q-19-SB-6 RA	All VOCs	detects J/ non-detects UJ	H
4	AT-Q-19-SB-6-D RA	All VOCs	detects J/ non-detects UJ	H

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?			x
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	x		
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)	x		
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below. The diluted sample SA-Q-10-SS-0.5-D DL surrogate recoveries were within control limits.

Sample ID	Surrogate recoveries	Surrogates	Surrogate Limits
AT-Q-21-SS-1	48	BFB	68-121
AT-Q-21-SS-1 RA	0 / 155	BFB/DBFM	68-121 / 66-127
AT-Q-21-SS-1-D	54	BFB	68-121
AT-Q-21-SS-1-D RA	0 / 147 / 63	BFB / DBFM / TOL	68-121 / 66-127 / 65-128
AT-Q-19-SB-6	51	BFB	68-121
AT-Q-19-SB-6 RA	62	BFB	68-121
AT-Q-19-SB-6-D	38	BFB	68-121
AT-Q-19-SB-6-D RA	0	BFB	68-121
SA-Q-10-SB-2	65	BFB	68-121
SA-Q-10-SB-2 RE	67	BFB	68-121

BFB=4-Bromofluorobenzene DBFM=Dibromofluoromethane TOL=Toluene-d8

Sample ID	Analytes	Qualification	Code
AT-Q-21-SS-1	All VOCs	J/UJ	S
AT-Q-21-SS-1 RA	All VOCs	J/R -- These R qualifiers supersede UJ qualifiers assigned due to holding times.	S
AT-Q-21-SS-1-D	All VOCs	J/UJ	S
AT-Q-21-SS-1-D RA	All VOCs	R -- These R qualifiers supersede UJ qualifiers assigned due to holding times.	S
AT-Q-19-SB-6	All VOCs	J/UJ	S
AT-Q-19-SB-6 RA	All VOCs	J/UJ	S
AT-Q-19-SB-6-D	All VOCs	J/UJ	S
AT-Q-19-SB-6-D RA	All VOCs	J/R -- These R qualifiers supersede UJ qualifiers assigned due to holding times.	S
SA-Q-10-SB-2	All VOCs	J/UJ	S
SA-Q-10-SB-2 RE	All VOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Samples SA-Q-13-SS-1 and SA-Q-15-SB-2 were the MS/MSD client designated samples. The MS/MSD recoveries in sample SA-Q-13-SS-1 were high for 1,2-dichloroethane, bromodichloromethane, 2-hexanone, 4-methyl-2-pentanone and styrene. The MSD recoveries in sample SA-Q-15-SB-2 were high for acetone, 1,2-dichloroethane, benzene, 2-hexanone and 4-methyl-2-pentanone. The MS/MSD recoveries for styrene were slightly low (71 & 70, 80-118). RPDs were within acceptance criteria for both MS/MSD samples. Qualifications were not made based on MS/MSD alone and the LCS recoveries for these two samples were within QC limits. No qualification of data were required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: Two LCS samples had percent recoveries out of criteria.

Sample ID	LCS recovery and ranges	Related Samples	Qualifiers Assigned	Code
680-11861/2	2-Butanone, 21, 30-149	SA-Q-11-SS-0.5	UJ	L
	same	SA-Q-11-SB-2,	UJ	L
	same	SA-Q-9-SS-0.5	J	L
	same	SA-Q-9-SB-5	UJ	L
	same	SA-Q-9-SB-5-D	UJ	L
	same	SA-Q-10-SS-0.5	J	L
	same	SA-Q-10-SS-0.5-D	J	L
	same	SA-Q-10-SB-2	UJ	L
	same	SA-Q-10-SB-2 RA	J	L
680-13213/2	Methylene chloride. 40, 54-150	SA-Q-10-SS-0.5-D DL	UJ	L
	Acetone, 8, 28-143	SA-Q-10-SS-0.5-D DL	R	L
	2-Hexanone 28, 30-148	SA-Q-10-SS-0.5-D DL	UJ	L

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?		x	
	Area > +100% / Area < -50% / Area < -10%			
	Positive: J / J / J			
	Non-detect: None / UJ / R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: There are several internal standards in different samples that are outside of criteria. Qualifications are listed below.

Sample ID	Internal Standards Area	Internal Standards	Lower and Upper Limits
AT-Q-21-SS-1	25045 / 34137 / 7582	DCA/ DFB/ CBZ	55688 - 222750 / 71536 - 286142 / 50530 - 202120
AT-Q-21-SS-1-D	23972 / 35772 / 7735	DCA/ DFB/ CBZ	55688 - 222750 / 71536 - 286142 / 50530 - 202120
AT-Q-19-SB-6	26597	CBZ	50530 - 202120
AT-Q-19-SB-6-D	40205 / 8315	DFB/ CBZ	71536 - 286142 / 50530 - 202120
SA-Q-10-SS-0.5-D	61558	CBZ	66066 -264266
SA-Q-10-SB-2	50781	CBZ	66066 -264266
SA-Q-10-SB-2 RA	100415 / 24045	DFB/ CBZ	165455 - 661820 / 66066 - 264266
AT-Q-21-SS-1 RA	3601 / 6452 /1171	DCA/ DFB/ CBZ	48304 - 193214 / 66378 - 265512 / 45964 - 183856
AT-Q-21-SS-1-D RA	3946 / 7238 / 1104	DCA/ DFB/ CBZ	48304 - 193214 / 66378 - 265512 / 45964 - 183856
AT-Q-19-SB-6 RA	27563 / 38623 / 12620	DCA/ DFB/ CBZ	48304 - 193214 / 66378 - 265512 / 45964 - 183856
AT-Q-19-SB-6 D RA	20624 /4004 / not available	DCA/ DFB/ CBZ	48304 - 193214 / 66378 - 265512 / 45964 - 183856

DCA = 1,2-Dichloroethane DFB = 1,4-Difluorobenzene CBZ = Chlorobenzene

Sample ID	Analytes	Qualification	Code
AT-Q-21-SS-1	All VOCs	Already J/UJ due to S	I
AT-Q-21-SS-1-D	All VOCs	Already J/UJ due to S	I
AT-Q-19-SB-6	All VOCs	Already J/UJ due to S	I
AT-Q-19-SB-6-D	All VOCs	Already J/UJ due to S	I
SA-Q-10-SS-0.5-D	All VOCs	J/UJ	I
SA-Q-10-SB-2	All VOCs	Already J/UJ due to S	I
SA-Q-10-SB-2 RA	All VOCs	Already J/UJ due to S	I
AT-Q-21-SS-1 RA	All VOCs	Already J/R due to S	I
AT-Q-21-SS-1-D RA	All VOCs	Already R due to S	I
AT-Q-19-SB-6 RA	All VOCs	Already J/UJ due to S	I
AT-Q-19-SB-6 D RA	All VOCs	Already J/R due to S	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		x	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-21-SS-1 was the parent sample to AT-Q-21-SS-1-D and sample AT-Q-19-SB-6 was the parent to AT-Q-19-SB-6 D.
Sample SA-Q-9-SB-5 was the parent sample to SA-Q-9-SB-5-D and sample SA-Q-10-SS-0.5 was the parent to SA-Q-10-SS-0.5-D.
Trichloroethene and tetrachloroethene had high RPD and absolute difference outside control limits in samples SA-Q-10-SS-0.5 and SA-Q-10-SS-0.5-D; therefore qualifiers were assigned accordingly.

Sample ID	Analytes	Reason for Qualifier	Qualifiers Assigned	Code
SA-Q-10-SS-0.5	Trichloroethene 28 ug/kg	103 % RPD	J	F
SA-Q-10-SS-0.5-D	Trichloroethene 87 ug/kg	103 % RPD	Already qualified J due to I	F
SA-Q-10-SS-0.5	Tetrachloroethene 140 ug/kg	difference >2xs the RL	J	F
SA-Q-10-SS-0.5-D	Tetrachloroethene 550 ug/kg D	difference >2xs the RL	J	F

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	18			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	4			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**99.3**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Amelia Turnell	**Project Name:**	Sauget - Area 2
Date:	10/12/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS012
		Review Level:	Level III

Major Anomalies:

Reanalysis results of one sample were qualified rejected due to missed holding times.

Minor Anomalies:

Several samples were qualified due to surrogate recoveries outside QC limits and method blank detections.

Field IDs:

SA-Q-15-SS-0.5	SA-Q-13-SB-2	SA-Q-11-SS-0.5
SA-Q-15-SB-2	AT-Q-21-SS-1	SA-Q-11-SB-2
SA-Q-14-SS-0.5	AT-Q-21-SS-1-D	SA-Q-9-SS-0.5
SA-Q-14-SB-5	AT-Q-19-SB-6	SA-Q-9-SB-5
SA-Q-13-SS-1	AT-Q-19-SB-6-D	SA-Q-9-SB-5-D
SA-Q-10-SB-2	SA-Q-10-SS-0.5-D	SA-Q-10-SS-0.5

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated detections in a few method blanks. Some surrogates, LCSs and MS/MSDs recoveries were outside the quality control limits. One sample was re-extracted and reanalyzed outside holding time.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: Sample SA-Q-11-SS-0.5 RE was re-extracted 30 days outside the holding time. Therefore, these results were rejected.

Field ID	Analyte	Qualification	Code
SA-Q-11-SS-0.5 RE	All SVOC analytes	R	H

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	x		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?			x
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: A few compounds were detected in the method blanks.

Field ID	Analyte	Qualification	New RL	Code
SA-Q-15-SS-0.5	Bis (2-ethylhexyl)phthalate	U	390	Z
SA-Q-13-SS-1	Bis (2-ethylhexyl)phthalate	U	360	Z
AT-Q-21-SS-1	Bis (2-ethylhexyl)phthalate	U	-	Z
AT-Q-21-SS-1-D	Bis (2-ethylhexyl)phthalate	U	-	Z
AT-Q-19-SB-6	Bis (2-ethylhexyl)phthalate	U	460	Z
AT-Q-19-SB-6-D	Bis (2-ethylhexyl)phthalate	U	590	Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?				x	
7.3	Are more than one of either fraction outside the acceptance criteria?			x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?				x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x		
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.					
		> UCL	10% to LCL	< 10%		
	Positive	J	J	J		
	Non-detect	None	UJ	R		

Note: Several samples had surrogate recoveries outside QC limits. Samples were not reanalyzed because they were out of holding time.

Field ID	Surrogate Recoveries	Surrogate	Surrogate Limits
SA-Q-15-SS-0.5	30 / 17 / 23	PHL / 2FP / TBP	38-102 / 36-101 / 27-124
SA-Q-14-SS-0.5	28 / 14 / 19	PHL / 2FP / TBP	38-102 / 36-101 / 27-124
SA-Q-14-SB-5	27 / 15	PHL / 2FP	38-102 / 36-101
AT-Q-21-SS-1-D	36 / 24 / 26	PHL / 2FP / TBP	38-102 / 36-101 / 27-124
AT-Q-19-SB-6	23 / 13 / 15 / 30 / 32 / 36	PHL / 2FP / TBP / NBZ / FBP / TPH	38-102 / 36-101 / 27-124 / 33-94 / 38-104 / 40-129
AT-Q-19-SB-6-D	34 / 22	PHL / 2FP	38-102 / 36-101

PHL = Phenol-d5 2FP = 2-Fluorophenol TBP = 2,4,6-Tribromophenol NBZ = Nitrobenzene-d5 FBP = 2-Fluorobiphenyl TPH = Terphenyl-d14

Field ID	Analyte	Qualification	Code
SA-Q-15-SS-0.5	all acid fraction	UJ	S
SA-Q-14-SS-0.5	all acid fraction	UJ	S
SA-Q-14-SB-5	all acid fraction	UJ	S
AT-Q-21-SS-1-D	all acid fraction	UJ	S
AT-Q-19-SB-6	all analytes	UJ/J	S
AT-Q-19-SB-6-D	all acid fraction	UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Samples SA-Q-13-SS-1 and SA-Q-15-SB-2 were the MS/MSD client designated samples. 2,4-Dimethylphenol MS/MSD recoveries were 27 & 30% (40-112) in parent sample SA-Q-13-SS-1. Hexachlorocyclopentadiene MSD recovery was 11% (20-109) in parent sample SA-Q-15-SB-2 and the RPD was 72% when the maximum allowed is 50%. Sample SA-Q-10-SB-2 was used as a batch MS/MSD sample. Several spiking compounds and RPDs were recovered outside of control limits. Qualifications were not made based on MS/MSDs alone and the LCS recoveries for these samples were within control limits.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.	x		

Note: 2,4,5-Trichlorophenol, 2,4-Dinitrophenol,4,6-Dinitro-2-methylphenol and pentachlorophenol LCS recoveries were outside of control limits in LCS 680-14752. No qualifiers were assigned because the sample related to this LCS was previously rejected due to holding times.

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?	x		
	Area > +100% Area < -50% Area < -10%			
	Positive J J J			
	Non-detect None UJ R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note:

11.0 TCL Identification

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?		x	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-21-SS-1 was the parent sample to AT-Q-21-SS-1-D and sample AT-Q-19-SB-6 was the parent to AT-Q-19-SB-6 D.
Sample SA-Q-9-SB-5 was the parent sample to SA-Q-9-SB-5-D and sample SA-Q-10-SS-0.5 was the parent to SA-Q-10-SS-0.5-D.
Bis(2-ethylhexyl)phthalate determination had an RPD of 91% for samples SA-Q-10-SS-0.5 and SA-Q-10-SS-0.5-D.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	18			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET

PCBs ANALYSIS (Method 680)

Reviewer:	Amelia Turnell	**Project Name:**	Sauget - Area 2
Date:	10/12/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS012
		Review Level:	Level III

Major Anomolies:

No major anomalies found in this SDG.

Minor Anomolies:

Several sample were qualified due to surrogate and LCS recoveries.

Field IDs:				
	SA-Q-15-SS-0.5	SA-Q-13-SS-1	SA-Q-9-SS-0.5	SA-Q-10-SB-2
	SA-Q-15-SB-2	SA-Q-13-SB-2	SA-Q-9-SB-5	SA-Q-10-SS-0.5-D
	SA-Q-14-SS-0.5	SA-Q-11-SS-0.5	SA-Q-9-SB-5-D	
	SA-Q-14-SB-5	SA-Q-11-SB-2	SA-Q-10-SS-0.5	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that surrogates, LCSs, MS/MSDs and internal standard recoveries were outside quality control limits. Several samples were diluted.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?			x
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?				x	
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)				x	
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note: Only one sample with the surrogate out of criteria was diluted by a factor greater than 10. The other samples with surrogates out of criteria were not diluted by a factor greater than 10. GPC clean-up was performed due to sample matrix and may have contributed to the surrogate loss.

Sample ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-Q-11-SS-0.5	Decachlorobiphenyl-13C12	25	30-130
SA-Q-11-SB-2	Decachlorobiphenyl-13C12	18	30-130
SA-Q-9-SB-5	Decachlorobiphenyl-13C12	19	30-130
SA-Q-10-SB-2	Decachlorobiphenyl-13C12	20	30-130

Sample ID	Analytes	Qualification	Code
SA-Q-11-SS-0.5	All PCB analytes	J/UJ	S
SA-Q-11-SB-2	All PCB analytes	J/UJ	S
SA-Q-9-SB-5	All PCB analytes	UJ	S
SA-Q-10-SB-2	All PCB analytes	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Samples SA-Q-15-SB-2 and SA-Q-13-SS-1MS/MSD recoveries were outside QC limits; however, the LCS sample associated with these MS/MSD samples had recoveries within QC limits. No qualfication of data were required. Sample SA-Q-10-SB-2 MS/MSD recoveries were outside QC limits. The LCS associated with this MS/MSD sample had the majority of the LCS recoveries low. This sample has already been qualified J/UJ due to surrogates, and no additional qualifiers were assigned.

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries outside the QC limits, qualifications are listed below.

LCS ID	Analytes	LCS Recoveries	Related Samples
LCS 680-11675	All analytes with the exception of DCB Decachlorobiphenyl and Trichlorobiphenyl.	All recoveries were below the lower control limit. Neither of the recoveries were below 10%.	SA-Q-11-SS-0.5, SA-Q-11-SB-2, SA-Q-9-SS-0.5, SA-Q-9-SB-5, SA-Q-9-SB-5-D, SA-Q-10-SS-0.5, SA-Q-10-SS-0.5-D and SA-Q-10-SB-2

Several related samples were already qualified due to low surrogate recoveries. Therefore, the additional qualifiers assigned are mentioned below.

Sample ID	Analytes	Qualification	Code
SA-Q-9-SS-0.5	All PCB	J/UJ	L
SA-Q-9-SB-5-D	All PCB	J/UJ	L
SA-Q-10-SS-0.5	All PCB	J/UJ	L
SA-Q-10-SS-0.5-D	All PCB	J/UJ	L

Nonachlorobiphenyl was not spiked in the LCS sample.

10.0 TCL Identification (Code w)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for VOC analysis?	x		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outsidethe acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample SA-Q-9-SB-5 was the parent sample to SA-Q-9-SB-5-D and sample SA-Q-10-SS-0.5 was the parent to SA-Q-10-SS-0.5-D.

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	14			
13.3	Number of target compounds in each analysis:	10			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/23/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS012
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on holding time criteria and method blank contamination.

Field IDs:

SA-Q-10-FB	AA-P-4-82	AA-P-4-102
AA-Q-10-18	AA-Q-10-18-D	AA-P-4-112
AA-Q-10-38	AA-P-9-34	AA-Q-10-58
AA-Q-10-78	AA-P-9-54	AA-Q-10-94

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The narrative indicated that the method blank had detections above the MDL.

Although it is beyond the scope of this review, it should be noted that the ICAL and CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: The samples were re-extracted and analyzed outside holding time limits. Qualifications are listed below.

Field ID	Analyte	Days late	Qualification	Code
SA-Q-10-FBRE	All Herbicides	9	J/UJ	H
AA-P-4-82RE	All Herbicides	9	J/UJ	H
AA-P-4-102RE	All Herbicides	9	J/UJ	H
AA-Q-10-18RE	All Herbicides	9	J/UJ	H
AA-Q-10-18-DRE	All Herbicides	9	J/UJ	H
AA-P-4-112RE	All Herbicides	9	J/UJ	H
AA-Q-10-38RE	All Herbicides	9	J/UJ	H
AA-P-9-34RE	All Herbicides	9	J/UJ	H
AA-Q-10-58RE	All Herbicides	9	J/UJ	H
AA-Q-10-78RE	All Herbicides	9	J/UJ	H
AA-P-9-54RE	All Herbicides	9	J/UJ	H
AA-Q-10-94RE	All Herbicides	9	J/UJ	H

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?	x		
3.3	Do any field/rinse/equipment blanks have positive results?	x		
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The method and field blanks had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	New RL	Qualification	Code
AA-P-4-82	2,4-D	-	U	X
AA-Q-10-18	2,4-D	-	U	X
AA-Q-10-18	Pentachlorophenol	1.4	U	X
AA-P-4-112	Pentachlorophenol	-	U	X
AA-Q-10-38	2,4-D	-	U	X
AA-Q-10-58	2,4-D	-	U	X
AA-Q-10-58	Pentachlorophenol	0.27	U	X
AA-Q-10-78	2,4-D	-	U	X
AA-Q-10-78	Pentachlorophenol	-	U	X
AA-Q-10-94	2,4-D	-	U	X
AA-Q-10-94RE	Pentachlorophenol	0.38	U	X

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?			x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL / 10% to LCL / < 10%			
	Positive: J / J / J			
	Non-detect: None / UJ / R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note: Sample AA-Q-10-18 was the parent sample for AA-Q-10-18-D

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	12			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review
Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Amelia Turnell	**Project Name:**	Sauget - Area 2
Date:	10/13/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 012
		Review Level:	Level III

Major Anomalies:

Three mercury samples were rejected due to hold times.

Minor Anomalies:

Samples required qualification based on holding times, blanks, laboratory duplicates, MS/MSD spikes, serial dilutions and field duplicate RPDs.

Field IDs:

SA-Q-15-SS-0.5	AT-Q-19-SB-6-D	SA-Q-11-SS-0.5
SA-Q-15-SB-2	SA-Q-13-SS-1	SA-Q-11-SB-2
SA-Q-10-SB-2	SA-Q-13-SB-2	SA-Q-9-SS-0.5
SA-Q-10-SS-0.5-D	AT-Q-21-SS-1	SA-Q-9-SB-5
SA-Q-14-SS-0.5	AT-Q-21-SS-1-D	SA-Q-9-SB-5-D
SA-Q-14-SB-5	AT-Q-19-SB-6	SA-Q-10-SS-0.5

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x									x		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{o}C \pm 2\ ^{o}C$)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that one serial dilution and the MS/MSDs had recoveries outside the QC limits. Several samples were diluted due to abundance of target analytes. The narrative also indicated that several mercury samples were analyzed outside holding times.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x								x		
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note: Several mercury samples were analyzed outside holding times. Qualifications are listed below.

Field ID	Analyte	Days past hold time	Qualification	Code
SA-Q-13-SB-2	Mercury	15	J	H
AT-Q-19-SB-6	Mercury	15	J	H
AT-Q-19-SB-6-D	Mercury	15	J	H
SA-Q-9-SS-0.5	Mercury	37	R	H
SAQ-9-SB-5	Mercury	37	R	H
SAQ-9-SB-5-D	Mercury	37	R	H

3.0 Instrument Calibration (Code C)

						ICP			ICP-MS			GFAA			CVAA-Hg		
						Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)							x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).																x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.							x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.							x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).							x									x
	Action:		R(+/-)	J(+)/UJ(-)	J(+)	R(+)											
		Mercury	< 65%	65% - 79%	121% - 135%	> 135%											
		Other Metals	< 75%	75% - 89%	111% - 125%	> 125%											

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.	x										x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL, the qualifications are listed below.

Sample ID	Analytes	Qualification	Code	NEW RL
SA-Q-9-SS-0.5	Sodium	U	P	150
SA-Q-9-SB-5	Sodium	U	P	110
SA-Q-9-SB-5-D	Sodium	U	P	140
SA-Q-10-SS-0.5-D	Sodium	U	P	220

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).		x								x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Samples SA-Q-15-SB-2 and SA-Q-13-SS-1 were analyzed in duplicate. Several analytes had RPD values outside QC limits, qualifications are listed below.

Sample ID	Analytes	Qualification	Code
SA-Q-15-SB-2	Iron	J	K
SA-Q-15-SB-2	Nickel	J	K
SA-Q-13-SS-1	Calcium	J	K

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)		x									x	
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: Samples SA-Q-15-SB-2 and SA-Q-13-SS-1 were spiked and analyzed for metals and mercury. Qualifications are listed below.

Field ID	Analyte	Recoveries	Limits
SA-Q-15-SB-2	Antimony	38 / 36 / 3	75-125 / 20
SA-Q-15-SB-2	Cadmium	22 / 110 / 23	75-125 / 20
SA-Q-15-SB-2	Nickel	53 / 337 /76	75-125 / 20
SA-Q-15-SB-2	Silver	140 / 113 / 15	75-125 / 20
SA-Q-13-SS-1	Antimony	42 / 44 / 5	75-125 / 20
SA-Q-13-SS-1	Potassium	108 / 131 / 7	75-125 / 20
SA-Q-15-SB-2	Mercury	148 / 291 / 11	80-120 / 20

Field ID	Analyte	Qualification	Code
SA-Q-15-SB-2	Antimony	J	M
SA-Q-15-SB-2	Cadmium	J	M
SA-Q-15-SB-2	Nickel	Already qualified due to K	M
SA-Q-15-SB-2	Silver	J	M
SA-Q-13-SS-1	Antimony	J	M
SA-Q-13-SS-1	Potassium	J	M
SA-Q-15-SB-2	Mercury	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x									x		
10.2	Was a five-fold dilution performed?	x									x		
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).		x								x		

Note: Samples SA-Q-15-SB-2, SA-Q-11-SS-0.5 and SA-Q-13-SS-1 were diluted and analyzed. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
SA-Q-15-SB-2	Lead	J	S
SA-Q-15-SB-2	Magnesium	J	S
SA-Q-15-SB-2	Zinc	J	S

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)		x								x		

Note: Sample AT-Q-21-SS-1 was the parent sample to AT-Q-21-SS-1-D and sample AT-Q-19-SB-6 was the parent to AT-Q-19-SB-6 D.
Sample SA-Q-9-SB-5 was the parent sample to SA-Q-9-SB-5-D and sample SA-Q-10-SS-0.5 was the parent to SA-Q-10-SS-0.5-D.
Duplicate samples were outside QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
AT-Q-21-SS-1	Aluminum	J	F
AT-Q-21-SS-1-D	Aluminum	J	F
AT-Q-21-SS-1	Barium	J	F
AT-Q-21-SS-1-D	Barium	J	F
AT-Q-21-SS-1	Cadmium	J	F
AT-Q-21-SS-1-D	Cadmium	J	F
AT-Q-21-SS-1	Lead	J	F
AT-Q-21-SS-1-D	Lead	J	F
AT-Q-21-SS-1	Magnesium	J	F

Field ID	Analyte	Qualification	Code
AT-Q-21-SS-1	Manganese	J	F
AT-Q-21-SS-1-D	Manganese	J	F
AT-Q-21-SS-1	Zinc	J	F
AT-Q-21-SS-1-D	Zinc	J	F
SA-Q-10-SS-0.5	Barium	J	F
SA-Q-10-SS-0.5-D	Barium	J	F
SA-Q-10-SS-0.5	Chromium	J	F
SA-Q-10-SS-0.5-D	Chromium	J	F
SA-Q-10-SS-0.5	Copper	J	F
SA-Q-10-SS-0.5-D	Copper	J	F
SA-Q-10-SS-0.5	Iron	J	F
SA-Q-10-SS-0.5-D	Iron	J	F
SA-Q-10-SS-0.5	Lead	J	F
SA-Q-10-SS-0.5-D	Lead	J	F
SA-Q-10-SS-0.5	Zinc	J	F
SA-Q-10-SS-0.5-D	Zinc	J	F

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	18		0		0		18
13.3	Number of target compounds in each analysis:	22		22		0		1
13.4	Number of results rejected and not reported:	0		0		0		3
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		#####		####		**83.3**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Amelia Turnell	**Project Name:**	Sauget - Area 2
Date:	10/13/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 012
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No analytes were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:

SA-Q-15-SS-0.5	SA-Q-13-SB-2	SA-Q-11-SS-0.5
SA-Q-15-SB-2	AT-Q-21-SS-1	SA-Q-11-SB-2
SA-Q-14-SS-0.5	AT-Q-21-SS-1-D	SA-Q-9-SS-0.5
SA-Q-14-SB-5	AT-Q-19-SB-6	SA-Q-9-SB-5
SA-Q-13-SS-1	AT-Q-19-SB-6-D	SA-Q-9-SB-5-D
SA-Q-10-SB-2	SA-Q-10-SS-0.5-D	SA-Q-10-SS-0.5

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Samples SA-Q-13-SS-1 and SA-Q-15-SB-2 were spiked and analyzed as the MS/MSD.

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted for ammonia analysis?	x		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-21-SS-1 was the parent sample to AT-Q-21-SS-1-D and sample AT-Q-19-SB-6 was the parent to AT-Q-19-SB-6 D.

Sample SA-Q-9-SB-5 was the parent sample to SA-Q-9-SB-5-D and sample SA-Q-10-SS-0.5 was the parent to SA-Q-10-SS-0.5-D.

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		x	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment.			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < $\pm$ PQL for aqueous, and RPD < 35% or difference < $\pm$ 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	18			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/19/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 013
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No analytes required qualification, based on this data review.

Field IDs:	SA-Q-10-FB	AA-P-4-82	AA-P-4-102
	AA-Q-10-18	AA-Q-10-18-D	AA-P-4-112
	AA-Q-10-38	AA-P-9-34	AA-Q-10-58
	AA-Q-10-78	AA-P-9-54	AA-Q-10-94
	TB-12		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: No anomalies were noted in the case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix / Preserved / Aromatic / All others			
	Aqueous / No / 7 days / 14 days			
	Yes / 14 days / 14 days			
	Soil/Sediment / 4 ^{o}C $\pm$2 ^{o}C / 14 days / 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	x		
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: The field blank sample had a detection of toluene; however all associated samples were reported as non-detect. No qualification of data was required.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?			x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?					x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.					
		> UCL	10% to LCL	< 10%		
	Positive	J	J	J		
	Non-detect	None	UJ	R		

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AA-Q-10-18 was the parent sample for AA-Q-10-18-D

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	13			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/19/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 013
		Review Level:	Level III

Major Anomalies:

Samples were rejected based on holding time criteria

Minor Anomalies:

Samples were qualified based on surrogate recoveries.

Field IDs:	SA-Q-10-FB	AA-P-4-82	AA-P-4-102
	AA-Q-10-18	AA-Q-10-18-D	AA-P-4-112
	AA-Q-10-38	AA-P-9-34	AA-Q-10-58
	AA-Q-10-78	AA-P-9-54	AA-Q-10-94

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: Samples were reanalyzed outside of holding time.

The surrogates and internal standards had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: One sample was reanalyzed outside holding time criteria. Qualifications are listed below.

Field ID	Analyte	Qualification	Days late	Code
AA-Q-10-38RE	All SVOCs	R	55	H

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?		x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Surrogate recoveries were outside QC limits for one sample. Qualifications are listed below.

Field ID	Surrogate	Surrogate recoveries	Surrogate Limits
AA-Q-10-38	2FP, FBP, NBZ, PHL, TBP	20, 47, 47, 12, 49	56-100, 59-103, 60-102, 55-104, 55-126

2FP=2-Fluorophenol, FBP=2-Fluorobiphenyl, NBZ=Nitrobenzene-d5, PHL=Phenol-d5, TBP2,4,6-Tribromophenol

Field ID	Analytes	Qualification	Code
AA-Q-10-38	All SVOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?					x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: The field blank had internal standards outside QC limits. No qualification of data was required.

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AA-Q-10-18 was the parent sample to AA-Q-10-18-D

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	12			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/19/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 013
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No qualifications were required in this SDG.

Field IDs: SA-Q-10-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS recovery was outside QC limits

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries outside the QC limits; however, the LCS is associated with the field blank. No qualification of data was required.

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		x	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	1			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/23/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS012
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on holding time criteria and method blank contamination.

Field IDs:

SA-Q-10-FB	AA-P-4-82	AA-P-4-102
AA-Q-10-18	AA-Q-10-18-D	AA-P-4-112
AA-Q-10-38	AA-P-9-34	AA-Q-10-58
AA-Q-10-78	AA-P-9-54	AA-Q-10-94

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The narrative indicated that the method blank had detections above the MDL.
Although it is beyond the scope of this review, it should be noted that the ICAL and CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: The samples were re-extracted and analyzed outside holding time limits. Qualifications are listed below.

Field ID	Analyte	Days late	Qualification	Code
SA-Q-10-FBRE	All Herbicides	9	J/UJ	H
AA-P-4-82RE	All Herbicides	9	J/UJ	H
AA-P-4-102RE	All Herbicides	9	J/UJ	H
AA-Q-10-18RE	All Herbicides	9	J/UJ	H
AA-Q-10-18-DRE	All Herbicides	9	J/UJ	H
AA-P-4-112RE	All Herbicides	9	J/UJ	H
AA-Q-10-38RE	All Herbicides	9	J/UJ	H
AA-P-9-34RE	All Herbicides	9	J/UJ	H
AA-Q-10-58RE	All Herbicides	9	J/UJ	H
AA-Q-10-78RE	All Herbicides	9	J/UJ	H
AA-P-9-54RE	All Herbicides	9	J/UJ	H
AA-Q-10-94RE	All Herbicides	9	J/UJ	H

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?	x		
3.3	Do any field/rinse/equipment blanks have positive results?	x		
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The method and field blanks had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	New RL	Qualification	Code
AA-P-4-82	2,4-D	-	U	X
AA-Q-10-18	2,4-D	-	U	X
AA-Q-10-18	Pentachlorophenol	1.4	U	X
AA-P-4-112	Pentachlorophenol	-	U	X
AA-Q-10-38	2,4-D	-	U	X
AA-Q-10-58	2,4-D	-	U	X
AA-Q-10-58	Pentachlorophenol	0.27	U	X
AA-Q-10-78	2,4-D	-	U	X
AA-Q-10-78	Pentachlorophenol	-	U	X
AA-Q-10-94	2,4-D	-	U	X
AA-Q-10-94RE	Pentachlorophenol	0.38	U	X

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?						x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note: Sample AA-Q-10-18 was the parent sample for AA-Q-10-18-D

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	12			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review
Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/23/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS013
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries.

Field IDs:

SA-Q-10-FB	AA-P-4-82	AA-P-4-102
AA-Q-10-18	AA-Q-10-18-D	AA-P-4-112
AA-Q-10-38	AA-P-9-34	AA-Q-10-58
AA-Q-10-78	AA-P-9-54	AA-Q-10-94

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x										x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C +2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

Although it is beyond the scope of this review, it should be noted that the CCV had recoveries outside QC limits.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL in the field blank; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

			ICP			ICP-MS			GFAA			CVAA-Hg		
			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?				x									
5.2	Are the ICS AB recoveries within 80% - 120%?				x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?				x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?				x									
	Action:	Not Spiked Analytes			Spiked analytes (ICS AB analytes)									
		< -IDL	> IDL		< 50%	50% - 79%		> 120%						
		UJ(-)	J(+)		R(+/-)	J(+)/UJ(-)		J(+)						

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ±2 X PQL for solids)? Action: If no, J(+).	x									x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note:

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)		x								x		
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												

Note: Sample AA-P-4-82 was spiked and analyzed as the MS/MSD. Potassium was recovered outside limits for the MS/MSD sample. Qualifications are listed below.

Field ID	Analyte	MS/MSD/RPD Values	MS/MSD/RPD Limits
AA-P-4-82	Potassium	129/132/1	75-125/20

Field ID	Analyte	Qualification	Code
AA-P-4-82	Potassium	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Sample AA-Q-10-18 was diluted and analyzed with all RPD values within QC limits.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < +2 x PQL and For solids, RPD < 100% or difference < +4 x PQL)	x									x		

Note: Sample AA-Q-10-18 was the parent sample to AA-Q-10-18-D

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	12		0		0		12
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		####		####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/19/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 013
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:	SA-Q-10-FB	AA-P-4-82	AA-P-4-102
	AA-Q-10-18	AA-Q-10-18-D	AA-P-4-112
	AA-Q-10-38	AA-P-9-34	AA-Q-10-58
	AA-Q-10-78	AA-P-9-54	AA-Q-10-94

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: No problems were noted in the laboratory case narrative.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?	X		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AA-Q-10-18 was the parent sample to AA-Q-10-18-D

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	X		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		X	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	X		

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		X		
12.2	Number of samples:	12			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/24/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 014
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No analytes required qualification, based on this data review.

Field IDs:

VAA-8-26	VAA-8-46	VAA-8-66
VAA-8-86	AA-P-9-74	AA-P-9-94
AA-P-9-114	AA-P-9-126	VAA-6-18
VAA-6-38	VAA-6-58	TRIP BLANK
UAA-9-110	UAA-9-121	AA-0-5-102
TB-15		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: No anomalies were noted in the case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?				x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 $^{o}C \pm 2\ ^{o}C$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	16			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/24/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 014
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on surrogate, internal standard, LCS recoveries, and method blank contamination.

Field IDs:

VAA-8-26	VAA-8-46	VAA-8-66
VAA-8-86	AA-P-9-74	AA-P-9-94
AA-P-9-114	AA-P-9-126	VAA-6-18
VAA-6-38	VAA-6-58	UAA-9-110
UAA-9-121	AA-0-5-102	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The method blank had recoveries above the MDL.

The MS/MSD and LCS had recoveries outside QC limits.

The surrogate and internal standard analytes had recoveries outside QC limits

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	x		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: The method blank had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	New RL	Qualification	Code
AA-P-9-126	Indeno[1,2,3-cd]pyrene	-	U	Z
AA-P-9-126	Benzo[g,h,i]perylene	-	U	Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?		x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Surrogate recoveries were outside QC limits. Qualification are listed below.

Field ID	Surrogate	Surrogate recoveries	Surrogate limits
VAA-8-46	2FP, PHL	49 / 39	56-100 / 55-104
VAA-8-66	2FP	101	56-100
AA-P-9-114	2FP, NBZ, PHL	112 / 108 / 112	56-100 / 60-102 / 55-104
VAA-6-38	PHL	48	55-104
UAA-9-121	2FP	101	56-100

2FP=2-Fluorophenol, NBZ=Nitrobenzene-d5, PHL=Phenol-d5

Field ID	Analyte	Qualification	Code
VAA-8-46	All Acid/fraction analytes	J/UJ	S
AA-P-9-114	All Acid/fraction analytes	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Several analytes were outside QC limits for the MS/MSD sample, however the LCS for these analytes was within QC limits. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note: Several analytes were outside QC limits for the LCS. Qualifications are listed below.

Field ID	Analyte	LCS recoveries	LCS limits
LCS 680-11311	Phenol	127	46-106
LCS 680-11311	Bis(2-Chloroethyl)ether	124	48-108
LCS 680-11311	2-Chlorophenol	119	54-106
LCS 680-11311	1,3-Dichlorobenzene	101	38-97
LCS 680-11311	1,4-Dichlorobenzene	97	40-92
LCS 680-11311	1,2-Dichlorobenzene	104	42-98
LCS 680-11311	2-Methylphenol	118	57-110
LCS 680-11311	3 & 4 Methylphenol	119	49-114
LCS 680-11311	Hexachloroethane	92	35-89
LCS 680-11311	Nitrobenzene	123	57-110
LCS 680-11311	Isophorone	117	60-113
LCS 680-11311	2-Nitrophenol	118	59-114
LCS 680-11311	2,4-Dichlorophenol	114	62-112
LCS 680-11311	2,4,6-Trichlorophenol	124	61-118
LCS 680-11311	2-Chloronaphthalene	113	58-111
LCS 680-11311	2-Nitroaniline	134	60-122
LCS 680-11311	4-Bromophenyl phenyl ether	115	50-112
LCS 680-11311	Hexachlorobenzene	124	60-122
LCS 680-11311	Pyrene	146	49-135
LCS 680-11311	Benzo[b]fluoranthene	135	44-130

Field ID	Analyte	Qualification	Code
AA-P-9-74	2-Chlorophenol	J	L
AA-P-9-94	2-Chlorophenol	J	L
AA-P-9-114	2-Chlorophenol	J	L
AA-P-9-114	1,4-Dichlorobenzene	J	L
AA-P-9-114DL	2-Chlorophenol	J	L
AA-P-9-126	2-Chlorophenol	J	L
AA-P-9-126	1,4-Dichlorobenzene	J	L
AA-0-5-102	2-Chlorophenol	J	L

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?		x	
	Area > +100% Area < -50% Area < -10%			
	Positive J J J			
	Non-detect None UJ R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: Several samples had internal standards outside QC limits. Qualifications are listed below.

Field ID	Analyte	IS Recovery High/Low	Qualification	Code
AA-P-9-114	All SVOCs	Low	J/UJ	I
VAA-8-66	All SVOCs	Low	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	14			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/24/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 014
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on blank contamination.

Field IDs:

VAA-8-26	VAA-8-46	VAA-8-66
VAA-8-86	AA-P-9-74	AA-P-9-94
AA-P-9-114	AA-P-9-126	VAA-6-18
VAA-6-38	VAA-6-58	UAA-9-110
UAA-9-121	AA-0-5-102	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the method blank had detections above the MDL.

Although it is beyond the scope of this review, it should be noted that the ICAL and CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?	x		
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: The method blank had a detection above the MDL for pentachlorophenol. Qualifications are listed below.

Field ID	Analyte	New RL	Qualification	Code
VAA-8-26	Pentachlorophenol	-	U	Z
VAA-8-66	Pentachlorophenol	0.6	U	Z
AA-P-9-94	Pentachlorophenol	0.27	U	Z
AA-P-9-114	Pentachlorophenol	-	U	Z
VAA-6-18	Pentachlorophenol	0.3	U	Z

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			x

Note:

6.0 Surrogate Recovery (Code S)

				Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?			x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?					x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		x	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		x	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	14			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/24/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS014
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries.

Field IDs:

VAA-8-26	VAA-8-46	VAA-8-66
VAA-8-86	AA-P-9-74	AA-P-9-94
AA-P-9-114	AA-P-9-126	VAA-6-18
VAA-6-38	VAA-6-58	UAA-9-110
UAA-9-121	AA-0-5-102	

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x										x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 °C ± 2 °C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

2.0 Holding Time (Code h)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code c)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code o - Calibration blank failure, Code p - Preparation blank failure, Code x - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: All samples associated with the blank contamination were greater than 5X the blank concentration. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code n)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code l - Recovery, Code e - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code k)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ±2 X PQL for solids) Action: If no, J(+).	x									x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note:

8.0 Spike Sample Analysis -Pre-Digestion (Code m - Recovery, Code d - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)		x								x		
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: The MS/MSD recovered chromium outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
VAA-8-46	Chromium	83/65	75-125

Field ID	Analyte	Qualification	Code
VAA-8-46	Chromium	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code s)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Sample VAA-8-26 was diluted and reanalyzed.

11.0 Field Duplicate Samples (Code f)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		x									x	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < +2 x PQL and for solids, RPD < 100% or difference < +4 x PQL)			x									x

Note:

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	14		0		0		14
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		**####**		**####**		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenbug	**Project Name:**	Sauget - Area 2
Date:	8/24/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 014
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on blank contamination and MS/MSD recoveries.

Field IDs:

VAA-8-26	VAA-8-46	VAA-8-66
VAA-8-86	AA-P-9-74	AA-P-9-94
AA-P-9-114	AA-P-9-126	VAA-6-18
VAA-6-38	VAA-6-58	UAA-9-110
UAA-9-121	AA-0-5-102	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The case narrative indicated that the MS/MSD had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?	x		
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The method blank had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	New RL	Qualification	Code
VAA-8-46	Ammonia	0.06	U	Z

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD sample had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/ MSD recoveries	MS/MSD Limits
VAA-8-46	Ammonia	56/56	90-110

Field ID	Analyte	Qualification	Code
VAA-8-46	Ammonia	UJ	M

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	x		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	x		

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	14			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Achintya Bezbaruah	**Project Name:**	Sauget - Area 2
Date:	8/29/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS015
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Some analytes required qualifications, based on LCS/LCSD recoveries.

Field IDs:

SA-Q-12-SS-0.5	AT-Q-36-SS-0.5
SA-Q-12-SB-6	AT-Q-SB-5
SA-Q-16-SS-0.5	AT-Q-35-WS-8'
SA-Q-16-SB-3	AT-Q-35-SS-0.5
AT-Q-36-SB-6	AT-Q-35-SB-6'

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: LCS/LCSD recoveries for some samples were outside the control limits.
Internal standard recoveries were outside the control limits.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?				x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 $^{o}C \pm 2\ ^{o}C$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			

	> UCL	10% to LCL	< 10%
Positive	J	J	J
Non-detect	None	UJ	R

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: LCS recoveries for 1,1-Dichloroethane were outside QC limits. See qualification below:

LCS ID	Analyte	LCS/LCSD Recoveries	LCS/LCSD Limits
LCS 680-12086	1,1-Dichloroethane	31/38	43-157
LCS 680-12190	Acetone	20/ -	28-143

Field ID	Analyte	Qualification	Code
SA-Q-12-SS-0.5	1,1-Dichloroethane	UJ	L
SA-Q-12-SB-6	1,1-Dichloroethane	UJ	L
SA-Q-16-SS-0.5	1,1-Dichloroethane	UJ	L
SA-Q-16-SB-3	1,1-Dichloroethane	UJ	L
AT-Q-36-SB-6	1,1-Dichloroethane	UJ	L
AT-Q-36-SS-0.5	1,1-Dichloroethane	UJ	L
AT-Q-SB-5	Acetone	UJ	L
AT-Q-35-WS-8'	Acetone	J	L

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?					x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: One sample had internal standards below QC limits. Qualifications are listed below.

Field ID	Analyte	IS recovery High/Low	Qualification	Code
SA-Q-12-SB-6	All VOCs	Low	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	18			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/6/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 015
		Review Level:	Level III

Major Anomalies:

Samples were rejected based on holding time criteria.

Minor Anomalies:

Samples were qualified based on MS/MSD, LCS, surrogate, and internal standard recoveries.

Field IDs:

SA-Q-12-SS-0.5	AT-Q-36-SS-0.5
SA-Q-12-SB-6	AT-Q-SB-5
SA-Q-16-SS-0.5	AT-Q-35-WS-8'
SA-Q-16-SB-3	AT-Q-35-SS-0.5
AT-Q-36-SB-6	AT-Q-35-SB-6'

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the surrogate, LCS/LCSD, MS/MSD, and internal standard recoveries for several samples were outside of control limits.

The narrative also indicated that samples were reanalyzed outside holding time.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: Two samples were re-extracted outside of holding time. Qualifications are listed below.

Field ID	Analyte	Qualification	Days Late	Code
SA-Q-16-SS-0.5RE	All SVOCs	R	35	H
SA-Q-16-SB-3RE	All SVOCs	R	35	H
AT-Q-36-SB-6RE	All SVOCs	R	35	H
AT-Q-36-SS-0.5RE	All SVOCs	R	35	H
AT-Q-SB-5RE	All SVOCs	R	33	H
AT-Q-35-WS-8REDL	All SVOCs	R	34	H
AT-Q-35-WS-8RE	All SVOCs	R	34	H
AT-Q-35-SS-0.5RE	All SVOCs	R	34	H

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?		x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?		x	
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-Q-16-SS-0.5	2FP, PHL, NBZ, FBP	22 / 27 / 29 / 36	36-101 / 38-102 / 33-94 / 38-104
AT-Q-36-SS-0.5	2FP, FBP, NBZ, PHL, TBP, TPH	11 / 19 / 15 / 14 / 16 / 24	36-101 / 38-104 / 33-94 / 38-102 / 27-124 / 40-129
AT-Q-SB-5	2FP, PHL, NBZ	25 / 33 / 32	36-101 / 38-102 / 33-94
AT-Q-35-WS-8	2FP, FBP, NBZ, PHL, TPH	15 / 27 / 20 / 21 / 34	36-101 / 38-104 / 33-94 / 38-102 / 40-129
AT-Q-35-SS-0.5	2FP, FBP, NBZ, PHL	23 / 33 / 27 / 28	36-101 / 38-104 / 33-94 / 38-102

2FP=2-Fluorophenol, FBP=2-Fluorobiphenyl, NBZ=Nitrobenzene-d5, PHL=Phenol-d5, TBP=2,4,6-Tribromophenol, TPH=Terphenyl-d14

Field ID	Analyte	Qualification	Code
SA-Q-16-SS-0.5	All SVOCs	J/UJ	S
AT-Q-36-SS-0.5	All SVOCs	J/UJ	S
AT-Q-SB-5	All Acid/fraction SVOCs	J/UJ	S
AT-Q-35-WS-8	All SVOCs	J/UJ	S
AT-Q-35-SS-0.5	All SVOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD sample SA-Q-16-SS-0.5 had 61 of its 65 analytes outside QC limits. Qualifications are listed below.

Field ID	Analyte	Number of analytes out	Total number of analytes	Qualification	Code
SA-Q-16-SS-0.5*	All SVOCs	61	65	J/UJ	M

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note: The LCS sample had several analytes outside QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-11834	2,4-Dinitrophenol	34	40-112
LCS 680-11834	2,4-Dichlorophenol	40	43-108
LCS 680-11834	1,2,4-Trichlorobenzene	35	36-98
LCS 680-11834	Hexachlorobutadiene	31	42-105
LCS 680-11834	2,4,6-Trichlorophenol	43	44-113
LCS 680-11834	2,4,5-Trichlorophenol	43	46-116
LCS 680-15248	2,4-Dinitrophenol	0	1-131
LCS 680-15248	Pentachlorophenol	1	27-116

Field ID	Analyte	Qualification	Code
SA-Q-12-SS-0.5	2,4-Dinitrophenol	UJ	L
SA-Q-12-SS-0.5	2,4-Dichlorophenol	UJ	L
SA-Q-12-SS-0.5	1,2,4-Trichlorobenzene	UJ	L
SA-Q-12-SS-0.5	Hexachlorobutadiene	UJ	L
SA-Q-12-SS-0.5	2,4,6-Trichlorophenol	UJ	L
SA-Q-12-SS-0.5	2,4,5-Trichlorophenol	R	L
SA-Q-12-SS-0.5	Pentachlorophenol	R	L
SA-Q-12-SB-6	2,4-Dinitrophenol	UJ	L
SA-Q-12-SB-6	2,4-Dichlorophenol	UJ	L
SA-Q-12-SB-6	1,2,4-Trichlorobenzene	UJ	L
SA-Q-12-SB-6	Hexachlorobutadiene	UJ	L
SA-Q-12-SB-6	2,4,6-Trichlorophenol	UJ	L
SA-Q-12-SB-6	2,4,5-Trichlorophenol	R	L
SA-Q-12-SB-6	Pentachlorophenol	R	L
AT-Q-SB-5	2,4-Dinitrophenol	UJ	L
AT-Q-SB-5	2,4-Dichlorophenol	UJ	L
AT-Q-SB-5	1,2,4-Trichlorobenzene	UJ	L
AT-Q-SB-5	Hexachlorobutadiene	UJ	L
AT-Q-SB-5	2,4,6-Trichlorophenol	UJ	L
AT-Q-SB-5	2,4,5-Trichlorophenol	R	L
AT-Q-SB-5	Pentachlorophenol	R	L
AT-Q-35-WS-8	2,4-Dinitrophenol	UJ	L
AT-Q-35-WS-8	2,4-Dichlorophenol	UJ	L
AT-Q-35-WS-8	1,2,4-Trichlorobenzene	UJ	L
AT-Q-35-WS-8	Hexachlorobutadiene	UJ	L
AT-Q-35-WS-8	2,4,6-Trichlorophenol	UJ	L
AT-Q-35-WS-8	2,4,5-Trichlorophenol	R	L
AT-Q-35-WS-8	Pentachlorophenol	R	L
AT-Q-35-SS-0.5	2,4-Dinitrophenol	UJ	L
AT-Q-35-SS-0.5	2,4-Dichlorophenol	UJ	L

Field ID	Analyte	Qualification	Code
AT-Q-35-SS-0.5	1,2,4-Trichlorobenzene	UJ	L
AT-Q-35-SS-0.5	Hexachlorobutadiene	UJ	L
AT-Q-35-SS-0.5	2,4,6-Trichlorophenol	UJ	L
AT-Q-35-SS-0.5	2,4,5-Trichlorophenol	R	L
AT-Q-35-SS-0.5	Pentachlorophenol	R	L
AT-Q-35-SB-6	2,4-Dinitrophenol	UJ	L
AT-Q-35-SB-6	2,4-Dichlorophenol	UJ	L
AT-Q-35-SB-6	1,2,4-Trichlorobenzene	UJ	L
AT-Q-35-SB-6	Hexachlorobutadiene	UJ	L
AT-Q-35-SB-6	2,4,6-Trichlorophenol	UJ	L
AT-Q-35-SB-6	2,4,5-Trichlorophenol	R	L
AT-Q-35-SB-6	Pentachlorophenol	R	L

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?					x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: Internal standards for several samples had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	IS recovery High/Low	Qualification	Code
AT-Q-35-SS-0.5	All detected SVOCs	High	J	I
SA-Q-16-SS-0.5*	All detected SVOCs	High	J	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	10			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/7/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 015
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on surrogate and MS/MSD recoveries.

Field IDs:

SA-Q-12-SS-0.5	SA-Q-12-SB-6	SA-Q-16-SS-0.5
SA-Q-16-SB-3	AT-Q-36-SB-6	AT-Q-36-SS-0.5
AT-Q-SB-5	AT-Q-35-WS-8	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that surrogate and MS/MSD recoveries were outside QC limits

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	Yes	Yes
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-Q-16-SS-0.5	Decachlorobiphenyl-13C12	15	30-130
SA-Q-16-SB-3	Decachlorobiphenyl-13C12	16	30-130
AT-Q-36-SB-6	Decachlorobiphenyl-13C12	17	30-130
AT-Q-36-SS-0.5	Decachlorobiphenyl-13C12	16	30-130
AT-Q-35-WS-8	Decachlorobiphenyl-13C12	20	30-130
AT-Q-36-SB-6	Tetrachloro-m-xylene	27	30-150

Field ID	Analyte	Qualification	Code
SA-Q-16-SS-0.5	All PCBs	J/UJ	S
SA-Q-16-SB-3	All PCBs	J/UJ	S
AT-Q-36-SB-6	All PCBs	J/UJ	S
AT-Q-36-SS-0.5	All PCBs	J/UJ	S
AT-Q-35-WS-8	All PCBs	J/UJ	S
AT-Q-36-SB-6	All Pesticides	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample SA-Q-16-SS-0.5 was analyzed as the MS/MSD sample. 9 out of 9 MS/MSD recoveries were outside QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
SA-Q-16-SS-0.5*	All PCBs	J/UJ	M

9.0 Laboratory Control Sample (LCS/LCSD) (Code l - LCS recovery Code e - RPD)

		Yes	Yes	Yes
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 TCL Identification (Code W)

		Yes	Yes	Yes
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	Yes	Yes
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		x	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	8			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/7/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 015
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs:

SA-Q-12-SS-0.5	SA-Q-12-SB-6	SA-Q-16-SS-0.5
SA-Q-16-SB-3	AT-Q-36-SB-6	AT-Q-36-SS-0.5
AT-Q-SB-5	AT-Q-35-WS-8	AT-Q-35-SS-0.5
AT-Q-35-SB-6		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code h)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

				Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?			x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?					x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		x	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		X		
12.2	Number of samples:	10			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/7/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 015
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on holding times and MS/MSD recoveries.

Field IDs:

SA-Q-12-SS-0.5	SA-Q-12-SB-16
SA-Q-16-SS-0.5	SA-Q-16-SB-3
AT-Q-36-SB-6	AT-Q-36-SS-0.5
AT-Q-SB-5	AT-Q-35-WS-8
AT-Q-35-SS-0.5	AT-Q-35-SB-6

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x									x		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C + 2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

The narrative also indicated that mercury was analyzed outside of holding time, and the method blank had detections above the MDL.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x								x		
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note: Two samples for mercury analysis were analyzed outside QC limits. Qualifications are listed below.

Field ID	Analyte	Days late	Qualification	Code
SA-Q-16-SB-3	Mercury	13	J	H
AT-Q-36-SB-6	Mercury	13	UJ	H

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	X									X		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		X									X	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	X									X		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		X									X	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).	X									X		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Samples AT-Q-36-SB-6 and SA-Q-12-SS-0.5 were analyzed in duplicate. All RPDs were within criteria.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)		x								x		
		%R > 125%	30% < %R < 74%	%R < 30%									
	Positive	J	J	J									
	Non-detect	None	UJ	R									

Note: Sample SA-Q-12-SS-0.5 was spiked and analyzed. Some recoveries were outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
SA-Q-12-SS-0.5	Antimony	34 / 35	75-125
SA-Q-12-SS-0.5	Barium	317 / 67	75-125
SA-Q-12-SS-0.5	Copper	114 / 50	75-125
SA-Q-12-SS-0.5	Lead	79 / 41	75-125
SA-Q-12-SS-0.5	Potassium	125 / 152	75-125

Field ID	Analyte	Qualification	Code
SA-Q-12-SS-0.5	Antimony	UJ	M
SA-Q-12-SS-0.5	Barium	J	M
SA-Q-12-SS-0.5	Copper	J	M
SA-Q-12-SS-0.5	Lead	J	M
SA-Q-12-SS-0.5	Potassium	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Samples SA-Q-12-SS-0.5, AT-Q-35-SS-0.5, and AT-Q-36-SB-6 were diluted and analyzed, all %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		x									x	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)			x									x

Note:

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	10		0		0		12
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		####		####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/7/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 015
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:

SA-Q-12-SS-0.5	SA-Q-12-SB-6	SA-Q-16-SS-0.5
SA-Q-16-SB-3	AT-Q-36-SB-6	AT-Q-36-SS-0.5
AT-Q-SB-5	AT-Q-35-WS-8	AT-Q-35-SS-0.5
AT-Q-35-SB-6		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		x	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	10			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Amelia Turnell	**Project Name:**	Sauget - Area 2
Date:	10/13/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 016
		Review Level:	Level III

Major Anomolies:

No data was rejected

Minor Anomolies:

No qualification of data were required.

Field IDs:

UAA-8-106	UAA-9-90	AA-0-5-22
UAA-8-106-D	UAA-6-78	AA-0-5-42
UAA-9-30	AA-0-5-42-D	TB-14
UAA-9-50	AA-05-62	UAA-6-98-D
UAA-9-50-D	UAA-6-98	AA-0-5-82
UAA-9-70		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The case narrative indicated that the MS/MSD had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?				x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is ouside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 $^{o}C \pm 2\ ^{o}C$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note: All samples were analyzed within holding times.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: There were no detections.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: All surrogate recoveries within evaluation criteria.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample UAA-6-78 was the MS/MSD client designated sample. Several compounds recovered low; however, no recoveries were <10%. The LCS was within QC limits; therefore, no qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All the LCS recoveries were within acceptance range.

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgement, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: All internal standard area counts and retention times were within evaluation criteria.

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note: TICs were not reported.

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outsidethe acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample UAA-8-106 was analyzed as the duplicate for UAA-8-106-D and sample UAA-9-50 was analyzed as the duplicate for UAA-9-50-D.
Sample UAA-6-98 was analyzed as the duplicate for UAA-6-98-D and sample AA-0-5-42 was analyzed as the duplicate for AA-0-5-42-D.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	16			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Amelia Turnell	**Project Name:**	Sauget - Area 2
Date:	10/14/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS016
		Review Level:	Level III

Major Anomalies:

One sample was rejected due to low internal standards.

Minor Anomalies:

Some samples were qualified due to surrogates, MS/MSD, LCS and internal standard recoveries.

Field IDs:

UAA-8-106	UAA-9-90	AA-0-5-22
UAA-8-106-D	UAA-6-78	AA-0-5-42
UAA-9-30	AA-0-5-42-D	UAA-9-70
UAA-9-50	AA-05-62	UAA-6-98-D
UAA-9-50-D	UAA-6-98	AA-0-5-82

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The case narrative indicated that surrogates, LCS and the MS/MSD had recoveries outside QC limits. In addition, internal standards also failed in one sample so it was reanalyzed.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10°C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: All samples were extracted and analyzed within holding time.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?			x
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: There were no detections.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?	x		
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?		x	
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: A few surrogate recoveries were outside QC limits. Qualifications are listed below.

Field ID	Surrogate Recoveries	Surrogate	Surrogate Limits
UAA-9-30	39 / 239 /115 / 230 / 299	PHL / TBP / NBZ / FBP / TPH	55-104 / 55-126 / 60-102 /59-103 / 10-154
AA-05-62	107 / 103/ 107	PHL / 2FP / NBZ	55 -104 / 56 -100 / 60-102

PHL = Phenol-d5 2FP = 2-Fluorophenol TBP = 2,4,6-Tribromophenol NBZ = Nitrobenzene-d5 FBP = 2-Fluorobiphenyl TPH = Terphenyl-d14

Field ID	Analytes	Quals	Code
AA-05-62	Acid fraction (only detections)	J	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample UAA-6-78 was used as the MS/MSD. Three analytes were outside QC limits. 4-chloroaniline (also out in the LCS) and 3,3 dichlorobenzene (recoveries of <10%) were qualified and are listed below.

Field ID	Analytes	MS/MSD Recoveries	RPD	Quals	Code
UAA-6-78	4-chloroaniline	11 and 18 percent	44 and allowed is 40	UJ	M
UAA-6-78	3,3 dichlorobenzene	3 and 4 percent	Within QC limits	R	M

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note: One LCS sample had 4-chloroaniline recovery of 18%. The range is 22 - 107. Qualifications are listed below.

Field ID	Analytes	Qualification	Code
UAA-8-106	4-chloroaniline	UJ	L
UAA-8-106-D	4-chloroaniline	UJ	L
UAA-9-50	4-chloroaniline	UJ	L
UAA-9-50-D	4-chloroaniline	UJ	L
UAA-9-70	4-chloroaniline	UJ	L
UAA-9-90	4-chloroaniline	UJ	L
UAA-6-78	4-chloroaniline	Already qualified due to M	L
UAA-6-98	4-chloroaniline	UJ	L
UAA-6-98-D	4-chloroaniline	UJ	L
AA-0-5-22	4-chloroaniline	UJ	L
AA-0-5-42	4-chloroaniline	UJ	L
AA-0-5-42-D	4-chloroaniline	UJ	L
AA-05-62	4-chloroaniline	UJ	L
AA-0-5-82	4-chloroaniline	UJ	L

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?					x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: Samples UAA-9-30 and UAA-9-30 RE internal standards were outside QC limits. Qualifications are listed below.

Field ID	Analytes	IS Recoveries Low/High	Internal Standards	Quals	Code
UAA-9-30	All SVOCs	IS Recoveries Low	ANT / CRY / PRY	R	I
UAA-9-30 RE	All SVOCs	IS Recovery Low	PRY	UJ	I

PHN = Phenanthrene-d10 CRY = Chrysene-d12 PRY = Perylene-d12 DCB = 1,4-Dichlorobenzene-d4 NPT = Naphthalene-d8 ANT = Acenaphthene-d10

The R qualifiers supersede the qualifiers assigned due to surrogates.

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample UAA-8-106 was analyzed as the duplicate for UAA-8-106-D and sample UAA-9-50 was analyzed as the duplicate for UAA-9-50-D.
Sample UAA-6-98 was analyzed as the duplicate for UAA-6-98-D and sample AA-0-5-42 was analyzed as the duplicate for AA-0-5-42-D.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	15			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	1			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**99.9**			

Note:

HERBICIDES ANALYSIS

Reviewer:	Amelia Turnell	**Project Name:**	Sauget - Area 2
Date:	10/14/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS016
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

One analyte was rejected due to low MS/MSD recovery.

Field IDs:

UAA-8-106	UAA-9-90	AA-0-5-22
UAA-8-106-D	UAA-6-78	AA-0-5-42
UAA-9-30	AA-0-5-42-D	UAA-9-70
UAA-9-50	AA-05-62	UAA-6-98-D
UAA-9-50-D	UAA-6-98	AA-0-5-82

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the MS/MSD PCP spike was recovered low. Although it is not part of this review, it should be noted that the CCV exceeded the %D criteria for 2,4-DB for 2 samples thus the grand mean exception rule was applied.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: All samples were extracted and analyzed within hold time.

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?			x
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The blanks did not have any detections.

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?						x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample UAA-6-78 was used as the MS/MSD. Pentachlorophenol recoveries were outside QC limits. The qualifier is listed below.

Field ID	Analytes	MS/MSD/RPD Recoveries	MS/MSD/RPD Limits
UAA-6-78	Pentachlorophenol	5 / 5 / NC	46-144 / 40

Field ID	Analyte	Qualification	Code
UAA-6-78	Pentachlorophenol	R	M

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: LCS results were within criteria.

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample UAA-8-106 was analyzed as the duplicate for UAA-8-106-D and sample UAA-9-50 was analyzed as the duplicate for UAA-9-50-D.
Sample UAA-6-98 was analyzed as the duplicate for UAA-6-98-D and sample AA-0-5-42 was analyzed as the duplicate for AA-0-5-42-D.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	15			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	1			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**99.3**			

Note:

DATA VALIDATION WORKSHEET - Level III Review
Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Amelia Turnell	**Project Name:**	Sauget - Area 2
Date:	10/14/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 016
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified due to holding times and MS/MSD recoveries.

Field IDs:

UAA-8-106	UAA-9-90	AA-0-5-22
UAA-8-106-D	UAA-6-78	AA-0-5-42
UAA-9-30	AA-0-5-42-D	UAA-9-70
UAA-9-50	AA-05-62	UAA-6-98-D
UAA-9-50-D	UAA-6-98	AA-0-5-82

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x									x		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C +2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits. Due to abundance, some analytes were reanalyzed at dilutions. In addition, one mercury sample was analyzed outside holding time.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x								x		
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note: Mercury in sample UAA-6-78 was analyzed outside holding time. The qualifier is listed below.

Field ID	Analyte	Days late	Qualification	Code
UAA-6-78	Mercury	6	UJ	H

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Potassium was detected above the IDL in the preparation blank; however, the sample values were greater than 5 times the blank result. No qualification of data were required.

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < + PQL for aqueous, and RPD < 35% or difference < + 2 X PQL for solids) Action: If no, J(+).	x									x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Sample UAA-6-78 was analyzed in duplicate. All RPD's were within criteria.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)		x								x		
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: Sample UAA-6-78 was spiked and the aluminum recovery was high (310 and 323 percent and the range is 75-125). The RPD was within limits The qualifier is listed below.

Field ID	Analyte	Qualification	Code
UAA-6-78	Aluminum	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x									x		
10.2	Was a five-fold dilution performed?	x									x		
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x									x		

Note: Samples AA-0-5-22 and UAA-6-78 were diluted and analyzed. All %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ±4 x PQL)	x									x		

Note: Sample UAA-8-106 was analyzed as the duplicate for UAA-8-106-D and sample UAA-9-50 was analyzed as the duplicate for UAA-9-50-D.
Sample UAA-6-98 was analyzed as the duplicate for UAA-6-98-D and sample AA-0-5-42 was analyzed as the duplicate for AA-0-5-42-D.

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	15		0		0		15
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		####		####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Amelia Turnell	**Project Name:**	Sauget - Area 2
Date:	10/14/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 016
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected

Minor Anomalies:

One sample was qualified due to MS/MSD recovery.

Field IDs:

UAA-8-106	UAA-9-90	AA-0-5-22
UAA-8-106-D	UAA-6-78	AA-0-5-42
UAA-9-30	AA-0-5-42-D	UAA-9-70
UAA-9-50	AA-05-62	UAA-6-98-D
UAA-9-50-D	UAA-6-98	AA-0-5-82

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The case narrative indicates that the MS/MSD recovery was outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		X	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			X
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			X
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample UAA-6-78 was used as the MS/MSD and had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD recoveries	MS/MSD Limits
UAA-6-78	Ammonia	36/35	90-110

Field ID	Analyte	Qual	Code
UAA-6-78	Ammonia	J	M

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted for ammonia analysis?	x		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample UAA-8-106 was analyzed as the duplicate for UAA-8-106-D and sample UAA-9-50 was analyzed as the duplicate for UAA-9-50-D. Sample UAA-6-98 was analyzed as the duplicate for UAA-6-98-D and sample AA-0-5-42 was analyzed as the duplicate for AA-0-5-42-D.

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	x		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment.		x	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	x		

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	14			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Amelia Turnell	**Project Name:**	Sauget - Area 2
Date:	10/15/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 017
		Review Level:	Level III

Major Anomalies:

There were no major anomalies in this SDG.

Minor Anomalies:

There were no qualifiers assigned.

Field IDs:

UAA-7-18	UAA-7-78	AA-Clay-2-42
UAA-7-38	UAA-7-98	AA-Clay-2-42-D
UAA-7-98-D	AA-Clay-2-62	UAA-7-58-D
Trip Blank	Trip Blank	Trip Blank
UAA-7-58	AA-Clay-2-22	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the MS/MSD recoveries for target compound 4-methyl-2-pentanone were low. Four samples were analyzed at primary dilutions due to target analyte abundance.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix / Preserved / Aromatic / All others			
	Aqueous / No / 7 days / 14 days			
	Yes / 14 days / 14 days			
	Soil/Sediment / 4 $^{o}C \pm 2\ ^{o}C$ / 14 days / 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note: All samples were analyzed within holding times.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: There were no detections in any of the blanks.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: All surrogate recoveries were within QC limits.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample UAA-7-38 was the MS/MSD client designated sample. The MS/MSD recoveries were low for 4-methyl-2-pentanone (57% and 56%, the range is 62-130%). The RPD was within limits. Qualifications were not made based on MS/MSD alone and the LCS recoveries associated with this sample was within QC limits. No qualification of data were required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS recoveries were within criteria.

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample UAA-7-58-D is the duplicate of sample UAA-7-58. Sample UAA-7-98-D is the duplicate of sample UAA-7-98. Sample AA-Clay-2-42-D is the duplicate of sample AA-Clay-2-42.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	14			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Amelia Turnell	**Project Name:**	Sauget - Area 2
Date:	10/16/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS017
		Review Level:	Level III

Major Anomalies:

None

Minor Anomalies:

A few samples were qualified estimated and estimated non-detect due to surrogate and internal standards recoveries outside QC limits.

Field IDs:

UAA-7-18	UAA-7-58-D	AA-Clay-2-22
UAA-7-38	UAA-7-78	AA-Clay-2-42
UAA-7-98	AA-Clay-2-42-D	UAA-7-58
UAA-7-98-D	AA-Clay-2-62	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated surrogate recoveries, 4-chloroaniline MS/MSD recoveries and one sample internal standards recovered outside the control limits. Several samples were anlayzed at dilutions. Sample UAA-7-58 is flagged with an Estimated (E) value for 1,4-dichlorobenzene. Due to a laboratory error, this sample was not re-analyzed at a dilution.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: All samples were extracted and analyzed within holding times.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?			x
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: There were no detections in the blanks.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?		x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?		x	
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Sample AA-Clay-2-22 DL surrogates were not recovered due to a dilution of 5. Qualifiers are listed below.

Field ID	Surrogate	Recoveries	Limit
AA-Clay-2-42 DL	Phenol / 2-Fluorophenol / Nitrobenzene	105 / 122 / 105	55-104 / 56-100 / 60 102

Field ID	Analytes	Qualifiers	Code
AA-Clay-2-42 DL	All analytes	J (only for detections)	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample UAA-7-38 was the MS/MSD client designated sample. The MS/MSD recoveries were low for 4-chloroaniline (16% and 20%, the range is 22-107%). The RPD was within limits. Qualifications were not made based on MS/MSD alone and the LCS recoveries associated with this sample was within QC limits. No qualification of data were required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note: All LCSs recoveries were within control limits.

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?					x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: Sample AA-Clay-2-42-D internal standards were outside of criteria. Qualifications are listed below.

Sample ID	Internal Standards Area	Internal Standards	Lower and Upper Limits
AA-Clay-2-42-D	25906 / 116925 / 58923 / 90922 / 90062 / 91237	DCB / NPT /ANT / PHN / CRY / PRY	39475-157900 / 169311-677244 / 83208 - 332832 / 125511 -502046 / 117157-468630 / 115821-463286

DCB=1,4-Dichlorobenzene NPT=Naphthalene ANT=Acenaphthene PHN=Phenanthrene CRY=Chrysene PRY=Perylene

Sample ID	Analytes	Qualification	Code
AA-Clay-2-42-D	All analytes	J/UJ	I

11.0 TCL Identification

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?		x	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample UAA-7-58-D is the duplicate of sample UAA-7-58. Sample UAA-7-98-D is the duplicate of sample UAA-7-98. Sample AA-Clay-2-42-D is the duplicate of sample AA-Clay-2-42. In samles AA-Clay-2-42 and its duplicate AA-Clay-2-42-D, compounds 2-methylphenol, 3 & 4 methylphenol, 4-chloro-3-methylphenol, di-n-butyl phthalate, butyl benzyl phthalate, bis(2-ethylhexyl)phthalate and di-n-octyl phthalate had absolute differences greater than 2 times the reporting limits.

Sample ID	Analytes	Reason for Qualifier	Qualifiers Assigned	Code
AA-Clay-2-42	2-Methylphenol 9.6 U	difference >2xs the RL	UJ	F
AA-Clay-2-42-D	2-Methylphenol 52 ug/kg	difference >2xs the RL	Already qualified due to I	F
AA-Clay-2-42	3 & 4 Methylphenol 110 ug/kg	difference >2xs the RL	J	F
AA-Clay-2-42-D	3 & 4 Methylphenol 3 ug/kg	difference >2xs the RL	Already qualified due to I	F
AA-Clay-2-42	4-Chloro-3-methylphenol 9.6 U	difference >2xs the RL	UJ	F
AA-Clay-2-42-D	4-Chloro-3-methylphenol 96 ug/kg	difference >2xs the RL	Already qualified due to I	F
AA-Clay-2-42	Di-n-butyl phthalate 9.6 U	difference >2xs the RL	UJ	F
AA-Clay-2-42-D	Di-n-butyl phthalate 57 ug/kg	difference >2xs the RL	Already qualified due to I	F
AA-Clay-2-42	Butyl benzyl phthalate 9.6 U	difference >2xs the RL	UJ	F
AA-Clay-2-42-D	Butyl benzyl phthalate 1000 ug/kg	difference >2xs the RL	Already qualified due to I	F
AA-Clay-2-42	Bis(2-ethylhexyl)phthalate 9.6 U	difference >2xs the RL	UJ	F
AA-Clay-2-42-D	Bis(2-ethylhexyl)phthalate 250 ug/kg	difference >2xs the RL	Already qualified due to I	F
AA-Clay-2-42	Di-n-octyl phthalate 9.6 U	difference >2xs the RL	UJ	F
AA-Clay-2-42-D	Di-n-octyl phthalate 88 ug/kg	difference >2xs the RL	Already qualified due to I	F

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	11			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Amelia Turnell	**Project Name:**	Sauget - Area 2
Date:	10/16/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 0017
		Review Level:	Level III

Major Anomalies:

There were no rejections.

Minor Anomalies:

One sample was qualified due to MS/MSD recovery.

Field IDs:

UAA-7-18	UAA-7-58-D	AA-Clay-2-22
UAA-7-38	UAA-7-78	AA-Clay-2-42
UAA-7-98	AA-Clay-2-42-D	UAA-7-58
UAA-7-98-D	AA-Clay-2-62	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the pentachlorophenol MS/MSD recovery was 0%. Sample AA-Clay-2-22 was analyzed at a dilution of 4 to bring PCP into the linear range.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
2.2	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: All samples were analyzed within holding times.

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: There were no detections in the blanks.

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?			x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: All surrogate recoveries were within limits.

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample UAA-7-38 was the client designated MS/MSD sample. Pentachlorophenol recovery was 0% in the MS/MSD (70-130%). The qualifier is listed below.

Field ID	Analyte	Qualification	Code
UAA-7-38	Pentachlorophenol	R	M

8.0 Laboratory Control Sample (LCS/LCSD) (Code l - LCS recovery Code e - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS and LCSD were recovered within limits.

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample UAA-7-58-D is the duplicate of sample UAA-7-58. Sample UAA-7-98-D is the duplicate of sample UAA-7-98. Sample AA-Clay-2-42-D is the duplicate of sample AA-Clay-2-42.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	11			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	1			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**99.1**			

Note:

DATA VALIDATION WORKSHEET - Level III Review
Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Amelia Turnell	**Project Name:**	Sauget - Area 2
Date:	10/16/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS017
		Review Level:	Level III

Major Anomolies:

No samples were rejected

Minor Anomolies:

One sample was qualified due to high spike recovery.

Field IDs:

UAA-7-18	UAA-7-58-D	AA-Clay-2-22
UAA-7-38	UAA-7-78	AA-Clay-2-42
UAA-7-98	AA-Clay-2-42-D	UAA-7-58
UAA-7-98-D	AA-Clay-2-62	

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x										x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{o}C \pm 2\ ^{o}C$)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note: All samples were analyzed within holding times.

3.0 Instrument Calibration (Code C)

						ICP			ICP-MS			GFAA			CVAA-Hg		
						Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)							x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).																x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.							x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.							x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).							x									x
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)												
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%												
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		x									x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		x									x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.			x									x
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).			x									x

Note: There were no detections in blanks.

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note: The LCS recoveries were within limits.

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).		x									x	
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Sample UAA-7-38 was analyzed in duplicate. All results were within control limits.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)		x									x	
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: Aluminum was recovered high in the spike sample UAA-7-38. The qualifier is listed below.

Sample ID	Analytes	MS/MSD/RPD	MS/MSD/RPD Limits
UAA-7-38	Aluminum	216 / 181 / 6	75-125 / 20

Sample ID	Analytes	Qualification	Code
UAA-7-38	Aluminum	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Sample UAA-7-38 was analyzed at a dilution.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)	x									x		

Note: Sample UAA-7-58-D is the duplicate of sample UAA-7-58. Sample UAA-7-98-D is the duplicate of sample UAA-7-98. Sample AA-Clay-2-42-D is the duplicate of sample AA-Clay-2-42.

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	11		0		0		11
13.3	Number of target compounds in each analysis:	22		22		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		**100**		**100**		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Amelia Turnell	**Project Name:**	Sauget - Area 2
Date:	10/16/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 017
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No analytes were rejected.

Minor Anomalies:

One sample was qualified based on MS/MSD recoveries.

Field IDs:

UAA-7-18	UAA-7-58-D	AA-Clay-2-22
UAA-7-38	UAA-7-78	AA-Clay-2-42
UAA-7-98	AA-Clay-2-42-D	UAA-7-58
UAA-7-98-D	AA-Clay-2-62	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: All samples were analyzed within holding times.

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?			x
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The blanks did not have detections.

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD sample had recoveries below the QC limits. The qualifier is listed below.

Field ID	Analyte	Qualification	Code
UAA-7-38	Ammonia	J	M

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS and LCSD recoveries were within limits.

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted for ammonia analysis?	x		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample UAA-7-58-D is the duplicate of sample UAA-7-58. Sample UAA-7-98-D is the duplicate of sample UAA-7-98. Sample AA-Clay-2-42-D is the duplicate of sample AA-Clay-2-42.

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		x	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment.			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	11			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/30/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 018
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on surrogate, LCS recoveries and method blank contamination.

Field IDs:

AT-Q-34-SB-6	AT-Q-34-SS-0.5	AT-Q-33-S-0.5
AT-Q-32-SB-6	AT-Q-32-SS-2	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS and surrogate recoveries were outside QC limits.
The narrative also indicated that the method blank had detections above the MDL.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?				x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 ^{o}C ±2 ^{o}C	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	x		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory flagged) concentrations.	"J"		
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: Several method blanks had contamination. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
AT-Q-34-SS-0.5	Chlorobenzene	U	-	Z
AT-Q-33-S-0.5DL	Methylene Chloride	U	-	Z
AT-Q-33-S-0.5DL	Chlorobenzene	U	-	Z
AT-Q-32-SB-6DL	Methylene Chloride	U	-	Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?		x	
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)	x		
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			

	> UCL	10% to LCL	< 10%			
Positive	J	J	J			
Non-detect	None	UJ	R			

Note: Surrogate recoveries were outside QC limits for one sample. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
AT-Q-32-SB-6	BFB, DBFM, TOL	133 / 140 / 139	68-121 / 66-127 / 65-128

BFB = 4-Bromofluorobenzene DBFM = Dibromofluoromethane TOL = Toluene-d8

Field ID	Analyte	Qualification	Code
AT-Q-32-SB-6	All detected VOCs	J	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: Several LCS analytes had recoveries outside QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS/LCSD Recoveries	LCS/LCSD Limits
LCS 680-13330	Acetone	22 / 25	28-143
LCS 680-13355	Acetone	20 / 22	28-143
LCS 680-13358	Chloromethane	31 / 73	42-140
LCS 680-13358	Acetone	18 / 28	28-143
LCS 680-13358	1,2-Dichloropropane	119 / 83	77-118
LCS 680-13358	Trichloroethene	106 / 75	80-122
LCS 680-13358	Ethylbenzene	110 / 81	82-118

Field ID	Analyte	Qualification	Code
AT-Q-34-SB-6	Acetone	J	L
AT-Q-33-S-0.5DL	Acetone	UJ	L
AT-Q-33-S-0.5	Acetone	J	L
AT-Q-32-SB-6DL	Chloromethane	UJ	L
AT-Q-32-SB-6DL	Acetone	UJ	L
AT-Q-32-SB-6DL	Trichloroethene	UJ	L
AT-Q-32-SB-6DL	Ethylbenzene	UJ	L

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	5			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/30/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 018
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified due to surrogate, internal standard recoveries, and method blank contamination.

Field IDs:

AT-Q-34-SB-6	AT-Q-34-SS-0.5	AT-Q-33-S-0.5
AT-Q-32-SB-6	AT-Q-32-SS-2	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The MS/MSD and surrogates had recoveries outside QC limits. The method blank had detections above the MDL.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: One method blank had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
AT-Q-34-SS-0.5	Bis-(2-ethylhexyl) phthalate	U	-	Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			x
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?		x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?	x		
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			

		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
AT-Q-34-SB-6	2FP, NBZ, PHL	20 / 32 / 32	36-101 / 33-94 / 38-102
AT-Q-34-SS-0.5	2FP	29	36-101
AT-Q-33-S-0.5	2FP, PHL	22 / 33	36-101 / 38-102
AT-Q-34-SB-6	2FP	30	36-101

2FP = 2-Fluorophenol NBZ = Nitrobenzene-d5 PHL = Phenol-d5

Field ID	Analyte	Qualification	Code
AT-Q-34-SB-6	All Acid/fraction analytes	J/UJ	S
AT-Q-33-S-0.5	All Acid/fraction analytes	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample AT-Q-34-SB-6 was analyzed as the MS/MSD. Several analytes were outside QC limits for the MS/MSD sample, however the LCS was within QC limits; therefore, no qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?					x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: Internal standard recoveries were below QC criteria for sample AT-Q-32-SB-6DL. Qualifications are listed below.

Field ID	Analyte	Internal standard Low/High	Qualification	Code
AT-Q-32-SB-6DL	All SVOCs	Low	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	5			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/30/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 018
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on surrogate and LCS recoveries.

Field IDs: AT-Q-33-S-0.5 AT-Q-32-SB-6 AT-Q-32-SS-2

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS, MS/MSD, and surrogate recoveries were outside QC limits

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?						x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note: One PCB surrogate was outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
AT-Q-33-S-0.5	Decachlorobiphenyl-13C12	24	30-130

Field ID	Analyte	Qualification	Code
AT-Q-33-S-0.5	All PCBs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The PCB MS/MSD sample AT-Q-33-S-0.5 had several analytes outside QC limits; however, all other QC parameters were within criteria. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries outside the QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS / LCSD Recoveries	LCS/LCSD Limits
LCS 680-11977	Endrin Ketone	44 / 53	47-156

Field ID	Analyte	Qualification	Code
AT-Q-33-S-0.5	Endrin Ketone	UJ	L
AT-Q-33-S-0.5DL	Endrin Ketone	UJ	L
AT-Q-32-SB-6	Endrin Ketone	UJ	L

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		x	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	3			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/30/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 018
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on LCS and MS/MSD recoveries.

Field IDs: AT-Q-34-SB-6, AT-Q-34-SS-0.5, AT-Q-33-S-0.5, AT-Q-32-SB-6, AT-Q-32-SS-2

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the MS/MSD and LCS had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?						x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample AT-Q-34-SS-0.5 was spiked and analyzed. Recoveries outside QC limits are listed in the following table.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
AT-Q-34-SS-0.5	Pentachlorophenol	56 / 62	71-109

Field ID	Analyte	Qualification	Code
AT-Q-34-SS-0.5	Pentachlorophenol	J	M

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: One LCS recovery was outside QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS/LCSD Recoveries	LCS/LCSD Limits
LCS 680-12347	Pentachlorophenol	69 / 74	71-109

LCS ID	Analyte	Qualification	Code
AT-Q-34-SB-6	Pentachlorophenol	J	L
AT-Q-34-SS-0.5*	Pentachlorophenol	J	L
AT-Q-33-S-0.5	Pentachlorophenol	J	L
AT-Q-32-SB-6	Pentachlorophenol	J	L
AT-Q-32-SS-2	Pentachlorophenol	UJ	L

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		x	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	5			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/30/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 018
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples are qualified based on holding times and MS/MSD recoveries.

Field IDs:

AT-Q-34-SB-6
AT-Q-34-SS-0.5
AT-Q-33-S-0.5
AT-Q-32-SB-6
AT-Q-32-SS-2

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x									x		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C +2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.
The narrative also indicated that the method blank had detections above the MDL.
It was also noted that the holding times had been exceeded.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x								x		
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note: One sampled was analyzed outside hold time for mercury. Qualifications are listed below.

Field ID	Analyte	Days late	Qualification	Code
AT-Q-34-SS-0.5	Mercury	1	J	H

3.0 Instrument Calibration (Code C)

						ICP			ICP-MS			GFAA			CVAA-Hg		
						Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)							x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).																x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.							x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.							x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).							x									x
	Action:		R(+/-)	J(+)/UJ(-)	J(+)	R(+)											
		Mercury	< 65%	65% - 79%	121% - 135%	> 135%											
		Other Metals	< 75%	75% - 89%	111% - 125%	> 125%											

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ±2 X PQL for solids) Action: If no, J(+).	x									x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Sample AT-Q-34-SS-0.5 was analyzed in duplicate.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)	x										x	
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: Sample AT-Q-34-SS-0.5 was spiked and analyzed as the MS/MSD. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
AT-Q-34-SS-0.5	Mercury	135 / 137	80-120

Field ID	Analyte	Qualification	Code
AT-Q-34-SS-0.5*	Mercury	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Samples AT-Q-34-SS-0.5 and AT-Q-32-SB-6 were diluted and analyzed, all %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		x									x	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ±2 x PQL and for solids, RPD < 100% or difference < ±4 x PQL)			x									x

Note:

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	5		0		0		5
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		####		####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/30/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 018
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:

AT-Q-34-SB-6	AT-Q-34-SS-0.5	AT-Q-33-S-0.5
AT-Q-32-SB-6	AT-Q-32-SS-2	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?		x	
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		x	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	5			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/24/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 019
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No analytes required qualification, based on this data review.

Field IDs:

AA-CLAY-2-82	AA-CLAY-2-102	AA-CLAY-2-119
TB-17	UAA-10-22	UAA-10-42
UAA-10-62	UAA-10-82	UAA-10-102
TB-19	AT-P-4-WS-10-FB	AT-P-4-SS-0.5-FB
SOIL-O-5-FB	TB-20	UAA-5-30
UAA-5-50	UAA-5-70	UAA-5-90
UAA-5-110	TB-21	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The case narrative indicated that the MS/MSD had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?				x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 $^{o}C \pm 2\ ^{o}C$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	x		
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The field blanks and trip blanks had detections above the MDL. All associated samples were non-detect for the corresponding analytes; therefore, no qualification of data was required.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			

		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?		x	
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Samples UAA-10-42 and UAA-5-50 were used as the MS/MSD samples. The MS/MSD sample recovered bromoform above the QC limits. The parent sample; however, recorded bromoform at non-detect. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	10			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/24/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 019
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified due to LCS recoveries and blank contamination.

Field IDs:

AA-CLAY-2-82	AA-CLAY-2-102	AA-CLAY-2-119
UAA-10-22	UAA-10-42	UAA-10-62
UAA-10-82	UAA-10-102	AT-P-4-WS-10-FB
AT-P-4-SS-0.5-FB	SOIL-O-5-FB	UAA-5-30
UAA-5-50	UAA-5-70	UAA-5-90
UAA-5-110		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The field blanks and method blanks had detections above the MDL. The MS/MSD and LCS had recoveries outside QC limits.
The surrogate analytes had recoveries outside QC limits

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	x		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?	x		
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The method blanks and field blanks had detections above the MDL. All associated analytes in the samples associated with the method blank were recorded non-detect, no qualification of data was required. Qualifications due to the field blank are listed below.

Field ID	Analyte	New RL	Qualification	Code
UAA-10-42	Bis(2-ethylhexyl) phthalate	-	U	X
UAA-10-62	Bis(2-ethylhexyl) phthalate	-	U	X

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?					x	
7.3	Are more than one of either fraction outside the acceptance criteria?					x	
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?						x
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?						x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.						
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note: Only one surrogate recovered outside QC limits in three different samples; therefore, no qualification of data was required.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Samples UAA-10-42 and UAA-5-50 were used as the MS/MSD samples. One analyte was outside QC limits for the MS/MSD sample, however the LCS was within QC limits for that analyte. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note: The LCS had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-11797	4-Chloroaniline	10	22-107
LCS 680-12077	Hexachlorobutadiene	39	43-109

Field ID	Analyte	Qualification	Code
AA-CLAY-2-82	4-Chloroaniline	UJ	L
AA-CLAY-2-102	4-Chloroaniline	J	L
AA-CLAY-2-102DL	4-Chloroaniline	UJ	L
AA-CLAY-2-119	4-Chloroaniline	UJ	L
UAA-10-22	Hexachlorobutadiene	UJ	L
UAA-10-42	Hexachlorobutadiene	UJ	L
UAA-10-62	Hexachlorobutadiene	UJ	L
UAA-10-82	Hexachlorobutadiene	UJ	L
UAA-10-102	Hexachlorobutadiene	UJ	L
AT-P-4-WS-10-FB	Hexachlorobutadiene	UJ	L
AT-P-4-SS-0.5-FB	Hexachlorobutadiene	UJ	L
SOIL-O-5-FB	Hexachlorobutadiene	UJ	L

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?		x	
	Area > +100% Area < -50% Area < -10%			
	Positive J J J			
	Non-detect None UJ R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	16			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/25/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 019
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No qualifications were required in this SDG.

Field IDs: AT-P-4-WS-10-FB AT-P-4-SS-0.5-FB SOIL-O-5-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?						x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		x	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	3			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/25/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 019
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs:

AA-CLAY-2-82	AA-CLAY-2-102	AA-CLAY-2-119
UAA-10-22	UAA-10-42	UAA-10-62
UAA-10-82	UAA-10-102	AT-P-4-WS-10-FB
AT-P-4-SS-0.5-FB	SOIL-O-5-FB	UAA-5-30
UAA-5-50	UAA-5-70	UAA-5-90
UAA-5-110		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the MS/MSD and LCS had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?						x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Samples UAA-10-42 and UAA-5-50 were used as the MS/MSD samples. The MS/MSD had recoveries outside QC limits for pentachlorophenol; however all other QC was within criteria. No qualification of data was required.

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		x	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		x	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	16			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/25/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 019
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries.

Field IDs:

AA-CLAY-2-82	AA-CLAY-2-102	AA-CLAY-2-119
UAA-10-22	UAA-10-42	UAA-10-62
UAA-10-82	UAA-10-102	AT-P-WS-10-FB
AT-P-4-SS-0.5-FB	SOIL-O-5-FB	UAA-5-30
UAA-5-50	UAA-5-70	UAA-5-90
UAA-5-110		

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x										x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{o}C \pm 2\ ^{o}C$)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

The narrative also indicated that the method blank had detections above the MDL.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code C)

					ICP			ICP-MS			GFAA			CVAA-Hg		
					Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)						x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).															x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.						x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.						x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).						x									x
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)											
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%											
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%											

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes				Spiked analytes (ICS AB analytes)								
	< -IDL > IDL				< 50% 50% - 79% > 120%								
	UJ(-) J(+)				R(+/-) J(+)/UJ(-) J(+)								

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	X									X		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		X									X	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	X									X		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		X									X	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).	X									X		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Sample UAA-5-50 was analyzed in duplicate, with all RPD values within QC limits.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)		x								x		
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: Samples UAA-10-42 and UAA-5-50 were used as the MS/MSD samples. The MS/MSD sample had several analytes outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recovery	MS/MSD Limit
UAA-5-50	Barium	106 / 143 / 18	75-125 / 20
UAA-5-50	Chromium	123 / 172 / 13	75-125 / 20
UAA-5-50	Potassium	119 / 166 / 9	75-125 / 20
UAA-5-50	Zinc	126 / 155 / 7	75-125 / 20

Field ID	Analyte	Qualification	Code
UAA-5-50	Barium	J	M
UAA-5-50	Chromium	J	M
UAA-5-50	Potassium	J	M
UAA-5-50	Zinc	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Sample AA-P-8-42 was diluted and analyzed, all %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		x									x	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)			x									x

Note:

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	16		0		0		16
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		####		####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/25/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 019
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries

Field IDs:

AA-CLAY-2-82	AA-CLAY-2-102	AA-CLAY-2-119
UAA-10-22	UAA-10-42	UAA-10-62
UAA-10-82	UAA-10-102	AT-P-WS-10-FB
AT-P-4-SS-0.5-FB	SOIL-O-5-FB	UAA-5-30
UAA-5-50	UAA-5-70	UAA-5-90
UAA-5-110		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative suggested that the MS/MSD had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Samples UAA-10-42 and UAA-5-50 were used as the MS/MSD samples. The MS/MSD sample had recoveries outside QC limits. Qualifications are listed below.

Filed ID	Analyte	MS/MSD Recovery	MS/MSD Limits
UAA-10-42	Ammonia	44 / 43 / 1	90-110 / 30
UAA-5-50	Ammonia	26 / 27 / 1	90-110 / 30

Filed ID	Analyte	Qualification	Code
UAA-10-42	Ammonia	J	M
UAA-5-50	Ammonia	J	M

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	x		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	x		

Note: Samples AA-CLAY-2-102, UAA-10-42, and UAA-5-50 were used as laboratory duplicate samples.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	16			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION REPORT

SUPPLEMENTAL INVESTIGATION – PHASE I

Sauget Area 2

Volume 1 – Text, Tables & Appendix B (SAS001 – SAS019)

Prepared for

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SAS020 through SAS004 Level IV

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix / Preserved / Aromatic / All others			
	Aqueous / No / 7 days / 14 days			
	Yes / 14 days / 14 days			
	Soil/Sediment / 4 $^{o}C \pm 2\ ^{o}C$ / 14 days / 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	x		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The method blank had detections above the MDL; however, all corresponding samples were non-detect for the analytes that had detections. No qualification of data were required.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	x		
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)	x		
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: One sample had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SOIL-O-5-SB-5.5	BFB, DBFM, TOL	0 / 0 / 0	68-121 / 66-127 / 65-128

BFB=4-Bromofluorobenzene DBFM=Dibromofluoromethane TOL=Toluene-d8

Field ID	Analytes	Qualifications	Code
SOIL-O-5-SB-5.5	All VOCs	J/R	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

Field ID	Analytes	MS/MSD Recoveries	MS/MSD Limits
AT-P-2-WS-10	Acetone	12 / 15	28-143
AT-P-2-WS-10	2-Butanone	28 / 30	30-149

Field ID	Analytes	Qualification	Code
AT-P-2-WS-10	Acetone	J	M
AT-P-2-WS-10	2-Butanone	UJ	M

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries outside QC limits. Qualifications are listed below.

LCS ID	Analytes	LCS Recoveries	LCS Limits
LCS 680-12927	Chloromethane	31	42-140
LCS 680-12927	Acetone	18	28-143
LCS 680-12927	2-Butanone	28	30-149
LCS 680-14101	Chloroethane	211	20-140

Field ID	Analytes	Qualification	Code
AT-P-4-SB-4	Chloromethane	UJ	L
AT-P-4-SB-4	Acetone	J	L
AT-P-4-SB-4	2-Butanone	UJ	L
AT-P-4-SB-4DL	Chloromethane	UJ	L
AT-P-4-SB-4DL	Acetone	UJ	L
AT-P-4-SB-4DL	2-Butanone	UJ	L
AT-P-4-SB-4-D	Chloromethane	UJ	L
AT-P-4-SB-4-D	Acetone	J	L
AT-P-4-SB-4-D	2-Butanone	UJ	L
AT-P-4-SB-4-DDL	Chloromethane	UJ	L
AT-P-4-SB-4-DDL	Acetone	UJ	L
AT-P-4-SB-4-DDL	2-Butanone	UJ	L

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?					x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: One sample had internal standard recoveries out of QC limits.

Field ID	Analytes	IS Recoveries High/Low	Qualification	Code
SOIL-O-6-SB-5	All VOCs	Low	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples AT-P-4-SB-4-D, SOIL-O-4-SS-0.5-D, and AT-P-4-SS-0.5-D were submitted as duplicates to samples AT-P-4-SB-4, SOIL-O-4-SS-0.5, and AT-P-4-SS-0.5 respectively

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	16			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/2/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 020
		Review Level:	Level III

Major Anomalies:

Samples were rejected based on holding times.

Minor Anomalies:

Samples were qualified based on surrogate recoveries.

Field IDs:

AT-P-4-SB-4	AT-P-4-SB-4-D	SOIL-O-6-SS-0.5
SOIL-O-6-SB-5	SOIL-O-5-SS-0.5	SOIL-O-5-SB-5.5
SOIL-O-4-SS-0.5	SOIL-O-4-SS-0.5-D	SOIL-O-4-SB-5.5
AT-P-2-WS-10	AT-P-2-SB-6	AT-P-4-SS-0.5
AT-P-2-SS-0.5	AT-P-2-SS-0.5-D	SOIL-O-7-SS-1.0
SOIL-O-7-SB-6.0		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: Samples were reanalyzed outside of holding time.
The MS/MSD and surrogates had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: Samples were re-extracted outside of holding time. Qualifications are listed below.

Field ID	Analyte	Qualification	Days late	Code
AT-P-2-WS-10RE	All SVOCs	R	43	H
AT-P-2-SB-6RE	All SVOCs	R	43	H
AT-P-2-SS-0.5RE	All SVOCs	R	43	H
SOIL-O-7-SS-1.0RE	All SVOCs	R	39	H

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?		x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL / 10% to LCL / < 10%			
	Positive: J / J / J			
	Non-detect: None / UJ / R			

Note: Several surrogate recoveries were outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SOIL-O-6-SB-5	2FP, FBP, NBZ, PHL, TPH	13 / 23 / 17 / 16 / 27	36-101 / 38-104 / 33-94 / 38-102 / 40-129
AT-P-2-WS-10	2FP, FBP, NBZ, PHL, TPH	27 / 37 / 26 / 29 / 38	36-101 / 38-104 / 33-94 / 38-102 / 40-129
AT-P-2-WS-10RE	2FP, FBP, NBZ, PHL, TBP, TPH	0 / 0 / 0 / 0 / 0 / 0	36-101 / 38-104 / 33-94 / 38-102 / 27-124 / 40-129
AT-P-2-SB-6	2FP, FBP, NBZ, PHL, TBP, TPH	3 / 7 / 4 / 4 / 4 / 8	36-101 / 38-104 / 33-94 / 38-102 / 27-124 / 40-129
AT-P-2-SS-0.5	2FP, FBP, NBZ, PHL, TBP, TPH	11 / 25 / 17 / 16 / 19 / 32	36-101 / 38-104 / 33-94 / 38-102 / 27-124 / 40-129
AT-P-2-SS-0.5RE	2FP, FBP, NBZ, PHL	26 / 36 / 26 / 33	36-101 / 38-104 / 33-94 / 38-102
SOIL-O-7-SS-1.0	FBP, NBZ, TBP, TPH	117 / 102 / 153 / 157	38-104 / 33-94 / 27-124 / 40-129
SOIL-O-7-SS-1.0RE	2FP, FBP, NBZ, PHL, TPH	15 / 18 / 16 / 17 / 39	36-101 / 38-104 / 33-94 / 38-102 / 40-129

2FP=2-Fluorophenol FBP=2-Fluorobiphenyl NBZ=Nitrobenzene-d5 PHL=Phenol-d5 TBP=2,3,6-Tribromophenol TPH=Ter[henyl-d14

Field ID	Analyte	Qualification	Code
SOIL-O-6-SB-5	All SVOCs	J/UJ	S
AT-P-2-WS-10	All SVOCs	J/UJ	S
AT-P-2-WS-10RE	All SVOCs	J/R	S
AT-P-2-SB-6	All SVOCs	J/UJ	S
AT-P-2-SS-0.5	All SVOCs	J/UJ	S
AT-P-2-SS-0.5RE	All SVOCs	J/UJ	S
SOIL-O-7-SS-1.0	All detected SVOCs	J	S
SOIL-O-7-SS-1.0RE	All SVOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Several analytes were outside QC limits for the MS/MSD sample, however the LCS was within QC limits; therefore, no qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples AT-P-4-SB-4, AT-P-2-SS-0.5, and Soil-O-4-SS-0.5 were the parent samples of AT-P-4-SB-4-D, AT-P-2-SS-0.5-D, and Soil-O-4-SS-0.5-D.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	16			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/2/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 020
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on LCS and MS/MSD recoveries.

Field IDs:

AT-P-4-SB-4	AT-P-4-SB-4-D	SOIL-O-5-SB-5.5
SOIL-O-4-SB-5.5	AT-P-2-WS-10	SOIL-O-7-SB-6.0

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS and MS/MSD had recoveries outside QC limits

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?			x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?					x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x
	> UCL	10% to LCL	< 10%			
	Positive J	J	J			
	Non-detect None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The PCB MS/MSD sample AT-P-2-WS-10 had several analytes that were well outside QC limits. Qualifications are listed below.

Field ID	Analytes	MS/MSD Recoveries	MS/MSD Limits
AT-P-2-WS-10	DCB Decachlorobiphenyl	18 / 2	30-130
AT-P-2-WS-10	Heptachlorobiphenyl	-28 / -40	40-140
AT-P-2-WS-10	Hexachlorobiphenyl	-326 / -345	40-140
AT-P-2-WS-10	Octachlorobiphenyl	3 / -5	40-140

Field ID	Analytes	Qualifications	Code
AT-P-2-WS-10	DCB Decachlorobiphenyl	J	M
AT-P-2-WS-10	Heptachlorobiphenyl	J	M
AT-P-2-WS-10	Hexachlorobiphenyl	J	M
AT-P-2-WS-10	Octachlorobiphenyl	J	M

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries outside the QC limits. Qualifications are listed below.

LCS ID	Analytes	LCS Recoveries	LCS Limits
LCS 680-12541	Monochlorobihphenyl	29	30-130
LCS 680-12541	Tetrachlorobiphenyl	37	40-140

Field ID	Analytes	Qualification	Code
AT-P-4-SB-4	Monochlorobihphenyl	UJ	L
AT-P-4-SB-4	Tetrachlorobiphenyl	J	L
AT-P-4-SB-4-D	Monochlorobihphenyl	UJ	L
AT-P-4-SB-4-D	Tetrachlorobiphenyl	UJ	L
SOIL-O-5-SB-5.5	Monochlorobihphenyl	J	L
SOIL-O-5-SB-5.5	Tetrachlorobiphenyl	UJ	L
SOIL-O-4-SB-5.5	Monochlorobihphenyl	J	L
SOIL-O-4-SB-5.5	Tetrachlorobiphenyl	UJ	L
AT-P-2-WS-10	Monochlorobihphenyl	J	L
AT-P-2-WS-10	Tetrachlorobiphenyl	J	L
SOIL-O-7-SB-6.0	Monochlorobihphenyl	J	L
SOIL-O-7-SB-6.0	Tetrachlorobiphenyl	UJ	L

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?	x		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-P-4-SB-4-D was submitted as the duplicate for AT-P-4-SB-4.

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	6			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/2/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 020
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on the LCS recoveries.

Field IDs:

AT-P-4-SB-4	AT-P-4-SB-4-D	SOIL-O-6-SS-0.5
SOIL-O-6-SB-5	SOIL-O-5-SS-0.5	SOIL-O-7-SB-6.0
SOIL-O-5-SB-5.5	SOIL-O-4-SS-0.5	SOIL-O-4-SS-0.5-D
SOIL-O-4-SB-5.5	AT-P-2-WS-10	AT-P-2-SB-6
AT-P-4-SS-0.5	AT-P-2-SS-0.5	AT-P-2-SS-0.5-D
SOIL-O-7-SS-1.0		
SOIL-O-7-SS-1.0		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

				Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?			x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?					x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x
	> UCL	10% to LCL	< 10%			
	Positive J	J	J			
	Non-detect None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS sample had recoveries outside QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-12546	Pentachlorophenol	67 / 82	71-109

Field ID	Analyte	Qualification	Code
AT-P-4-SB-4	Pentachlorophenol	J	L
AT-P-4-SB-4-D	Pentachlorophenol	J	L

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples AT-4-SB-4-D, SOIL-O-4-SS-0.5-D, and AT-P-2-SS-0.5-D were submitted as the duplicate samples for AT-4-SB-4, SOIL-O-4-SS-0.5, and AT-P-2-SS-0.5 respectively.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	16			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/2/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 020
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on holding times and MS/MSD recoveries.

Field IDs:

AT-P-4-SB-4	AT-P-4-SB-4-D	SOIL-O-6-SS-0.5
SOIL-O-6-SB-5	SOIL-O-5-SS-0.5	SOIL-O-5-SB-5.5
SOIL-O-4-SS-0.5	SOIL-O-4-SS-0.5-D	SOIL-O-4-SB-5.5
AT-P-2-WS-10	AT-P-2-SB-6	AT-P-4-SS-0.5
AT-P-2-SS-0.5	AT-P-2-SS-0.5-D	SOIL-O-7-SS-1.0
SOIL-O-7-SB-6.0		

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x									x		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 °C ± 2 °C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

The narrative also indicated that the holding time for mercury was exceeded.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x								x		
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note: One mercury sample was analyzed outside QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Days late	Code
SOIL-O-4-SB-5.5	Mercury	J	4	H

3.0 Instrument Calibration (Code C)

						ICP			ICP-MS			GFAA			CVAA-Hg		
						Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)							x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).																x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.							x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.							x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).							x									x
	Action:		R(+/-)	J(+)/UJ(-)	J(+)	R(+)											
		Mercury	< 65%	65% - 79%	121% - 135%	> 135%											
		Other Metals	< 75%	75% - 89%	111% - 125%	> 125%											

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note:

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV) Action: Solid Aqueous < LCL > UCL < 50% 50% - 79% > 120%		x									x	
	J(+)/UJ(-) J(+) R(+/-) J(+)/UJ(-) J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).	x									x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Samples AT-P-2-WS-10 and AT-P-4-SS-0.5 were analyzed as the duplicate samples.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)		x								x		
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: Samples AT-P-2-WS-10 and AT-P-4-SS-0.5 were spiked and analyzed with several recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
AT-P-4-SS-0.5	Antimony	47 / 47	75-125
AT-P-4-SS-0.5	Barium	81 / -6	75-125
AT-P-4-SS-0.5	Nickel	32 / 44	75-125
AT-P-4-SS-0.5	Potassium	133 / 124	75-125
AT-P-4-SS-0.5	Sodium	74 / 74	75-125
AT-P-2-WS-10	Antimony	52 / 45	75-125
AT-P-2-WS-10	Barium	341 / 67	75-125
AT-P-2-WS-10	Cadmium	23 / 109	75-125
AT-P-2-WS-10	Manganese	54 / 12	75-125

Field ID	Analyte	Qualification	Code
AT-P-4-SS-0.5	Antimony	J	M
AT-P-4-SS-0.5	Barium	J	M
AT-P-4-SS-0.5	Nickel	J	M
AT-P-4-SS-0.5	Potassium	J	M
AT-P-4-SS-0.5	Sodium	J	M
AT-P-2-WS-10	Antimony	J	M
AT-P-2-WS-10	Barium	J	M
AT-P-2-WS-10	Cadmium	J	M
AT-P-2-WS-10	Manganese	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Samples AT-P-4-SB-4, AT-P-2-WS-10, and SOIL-O-7-SS-1.0 was diluted and analyzed, all %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ±4 x PQL)	x									x		

Note: Samples AT-P-4-SB-4, AT-P-2-SS-0.5, and SOIL-O-4-SS-0.5 were the parent samples of AT-P-4-SB-4-D, AT-P-2-SS-0.5-D, and SOIL-O-4-SS-0.5-D.

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	16		0		0		16
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		####		####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/6/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 020
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:

AT-P-4-SB-4	AT-P-4-SB-4-D	SOIL-O-6-SS-0.5
SOIL-O-6-SB-5	SOIL-O-5-SS-0.5	SOIL-O-5-SB-5.5
SOIL-O-44-SS-0.5	SOIL-O-4-SS-0.5-D	SOIL-O-4-SB-5.5
AT-P-2-WS-10	AT-P-2-SB-6	AT-P-4-SS-0.5
AT-P-2-SS-0.5	AT-P-2-SS-0.5-D	SOIL-O-7-SS-1.0
SOIL-O-7-SB-6.0		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matri*Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Samples AT-P-2-WS-10 and AT-P-4-SS-0.5 were spiked and analyzed as MS/MSD samples.

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?	x		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples AT-P-4-SB-4, SOIL-O-4-SS-0.5, and AT-P-2-SS-0.5 were the parent samples for AT-P-4-SB-4-D. SOIL-O-4-SS-0.5-D, and AT-P-2-SS-0.5-D.

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	x		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	x		

Note: Sample SOIL-O-7-SS-1.0 was analyzed in duplicate.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	16			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/1/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 021
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No analytes required qualification, based on this data review.

Field IDs: AT-P-4-NAPL

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix / Preserved / Aromatic / All others			
	Aqueous / No / 7 days / 14 days			
	Yes / 14 days / 14 days			
	Soil/Sediment / 4 $^{o}C \pm 2\ ^{o}C$ / 14 days / 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			

	> UCL	10% to LCL	< 10%
Positive	J	J	J
Non-detect	None	UJ	R

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	1			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/1/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 021
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on holding times and method blank contamination.

Field IDs: AT-P-4-NAPL

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x									x		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 °C ± 2 °C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the method blank had detections, and that holding times were outside the QC limits.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x								x		
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note: One sample had mercury analyzed outside holding time criteria. Qualifications are listed below.

Field ID	Analyte	Days late	Qualification	Code
AT-P-4-NAPL	Mercury	5	J	H

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
AT-P-4-NAPL	Lead	U	1.1	P
AT-P-4-NAPL	Sodium	U	-	P

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid Aqueous												
	< LCL > UCL < 50% 50% - 79% > 120%												
	J(+)/UJ(-) J(+) R(+/-) J(+)/UJ(-) J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ±2 X PQL for solids) Action: If no, J(+).	x									x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: All duplicate samples were not associated with this SDG.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.		x									x	
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x									x
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)			x									x
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note:

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Sample AT-P-4-NAPL was diluted and analyzed, all %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		x									x	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ±2 x PQL and for solids, RPD < 100% or difference < ±4 x PQL)			x									x

Note:

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	1		0		0		1
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		**####**		**####**		**100**

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/5/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 022
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No analytes required qualification, based on this data review.

Field IDs: TB-22 AT-Q-20-SB-6-FB TB-23

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?				x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 $^{o}C \pm 2\ ^{o}C$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?			x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?					x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.					
		> UCL	10% to LCL	< 10%		
	Positive	J	J	J		
	Non-detect	None	UJ	R		

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	3			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Bradenburg	**Project Name:**	Sauget - Area 2
Date:	10/5/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 022
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG

Field IDs: AT-Q-30-SB-6-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?	x		
7.3	Are more than one of either fraction outside the acceptance criteria?		x	
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?			x
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	1			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/5/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 022
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No qualifications were required in this SDG.

Field IDs: AT-Q-30-SB-6-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?			x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?					x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		x	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	1			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/5/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 022
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs: AT-Q-30-SB-6-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?			x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		x	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	1			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review
Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/5/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 022
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification

Field IDs: AT-Q-30-SB-6-FB

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x									x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C ± 2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note:

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code C)

					ICP			ICP-MS			GFAA			CVAA-Hg		
					Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)						x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).															x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.						x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.						x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).						x									x
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)											
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%											
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%											

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note:

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ±2 X PQL for solids) Action: If no, J(+).	x									x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note:

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.		x									x	
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x									x
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)			x									x
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note:

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?		x										
10.2	Was a five-fold dilution performed?			x									
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).			x									

Note:

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		x									x	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)			x									x

Note:

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	1		0		0		1
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		####		####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/5/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 022
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs: AT-Q-30-SB-6-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		x	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	1			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/31/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 023
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on internal standard and LCS recoveries, method blank contamination and holding time failures.

Field IDs:	SOIL-0-9	SOIL-0-10	SOIL-0-8
	IDW-SITES	IDW-AT-Q-32	AT-Q-30-SB-6

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the MS/MSD, LCS and internal standard recoveries were outside QC limits. The narrative also indicated that the holding times and method blanks were outside QC limits.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?				x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).				x		
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 $^{o}C \pm 2\ ^{o}C$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note: Sample IDW-SITES was reanalyzed outside holding times. Qualifications are listed below.

Field ID	Analyte	Qualification	Days Late	Code
IDW-SITES	All VOCs	J/UJ	11	H

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	x		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: Several method blanks had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
IDW-SITES	Methylene Chloride	U	-	Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?						x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.						
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD sample AT-Q-30-SB-6 had 15 out of 36 analytes outside QC limits. The other QC was all within limits. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: Several LCS analytes were outside QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-14101	Chloroethane	211	20-140
LCS 680-14160	Chloroethane	242	20-140
LCS 680-14160	Tetrachloroethene	73	79-132
LCS 680-14404	Acetone	19	28-143
LCS 680-14404	2-Butanone	28	30-149

Field ID	Analyte	Qualification	Code
AT-Q-30-SB-6	Tetrachloroethene	UJ	L
SOIL-0-8	Acetone	UJ	L
SOIL-0-8	2-Butanone	UJ	L
IDW-AT-Q-32	Acetone	UJ	L
IDW-AT-Q-32	2-Butanone	UJ	L

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?					x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: Several internal standards are outside QC limits for one sample. Qualifications are listed below.

Field ID	Analyte	Internal Standard Low/High	Qualification	Code
IDW-SITESRA	All VOCs	Low	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	6			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/31/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 023
		Review Level:	Level III

Major Anomalies:

Samples were rejected based on LCS recoveries and holding time criteria.

Minor Anomalies:

Samples were qualified based on MS/MSD, LCS, surrogate recoveries, method blank contamination, and hold time criteria.

Field IDs:	SOIL-0-9	SOIL-0-10	SOIL-0-8
	IDW-SITES	IDW-AT-Q-32	AT-Q-30-SB-6

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: Samples were reanalyzed outside of holding time due to internal standards outside QC limits.
The MS/MSD, LCS, and surrogate recoveries were outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: Two samples were re-extracted outside of holding time. Qualifications are listed below.

Field ID	Analyte	Qualification	Days Late	Code
SOIL-0-8RE	All VOCs	R	38	H
IDW-SITESRE	All VOCs	R	38	H

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	x		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The method blank had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
SOIL-0-9	Pentachlorophenol	U	-	Z
SOIL-0-10	Pentachlorophenol	U	-	Z
SOIL-0-8	Pentachlorophenol	U	-	Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			x
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?				x	
7.3	Are more than one of either fraction outside the acceptance criteria?			x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?				x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?				x	
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.					
		> UCL	10% to LCL	< 10%		
	Positive	J	J	J		
	Non-detect	None	UJ	R		

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SOIL-0-9	2FP, PHL	23 / 28	36-101 / 38-102
SOIL-0-10	2FP, PHL	26 / 33	36-101 / 38-102
SOIL-0-8	2FP, PHL	26 / 33	36-101 / 38-102
IDW-SITES	2FP, FBP, NBZ, PHL, TBP, TPH	17 / 26 / 22 / 20 / 24 / 29	-101 / 38-104 / 33-94 / 38-102 / 27-124 / 40-129
IDW-AT-Q-32	2FP, FBP, NBZ, PHL	21 / 36 / 29 / 25	36-101 / 38-104 / 33-94 / 38-102
AT-Q-30-SB-6	2FP, PHL	26 / 33	36-101 / 38-102

2FP=2-Fluorophenol, FBP=2-Fluorobiphenyl, NBZ=Nitrobenzene-d5, PHL=Phenol-d5, TBP=2,4,6-Tribromophenol, TPH=Terphenyl-d14

Field ID	Analyte	Qualification	Code
SOIL-0-9	All Acid/fraction SVOCs	J/UJ	S
SOIL-0-10	All Acid/fraction SVOCs	J/UJ	S
SOIL-0-8	All Acid/fraction SVOCs	J/UJ	S
IDW-SITES	All SVOC	J/UJ	S
IDW-AT-Q-32	All SVOC	J/UJ	S
AT-Q-30-SB-6*	All Acid/fraction SVOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD sample AT-Q-30-SB-6 had 61 of its 65 analytes outside QC limits. Qualifications are listed below.

Field ID	Analyte	Number of analytes out	Total number of analytes	Qualification	Code
AT-Q-30-SB-6	All SVOCs	61	65	J/UJ	M

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note: The LCS sample had several analytes outside QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-13397	2,4-Dinitrophenol	0	1-131
LCS 680-13397	Pentachlorophenol	16	27-116
LCS 680-13397	Butyl benzyl phthalate	0	43-127
LCS 680-13397	3,3'-Dichlorobenzidine	0	1-118
LCS 680-13397	Bis (2-ethylhexyl) phthalate	1	25-134
LCS 680-13397	Chrysene	0	46-118
LCS 680-13397	Benzo[b]fluoranthene	1	35-122
LCS 680-13397	Benzo[k]fluoranthene	0	36-124
LCS 680-13397	Benzo[a]pyrene	1	37-120
LCS 680-13397	Indeno[1,2,3-cd]pyrene	1	36-133
LCS 680-13397	Benzo[g,h,i]perylene	0	41-122

Field ID	Analyte	Qualification	Code
SOIL-0-9	2,4-Dinitrophenol	R	L
SOIL-0-9	Pentachlorophenol	J	L
SOIL-0-9	Butyl benzyl phthalate	R	L
SOIL-0-9	3,3'-Dichlorobenzidine	UJ	L
SOIL-0-9	Bis (2-ethylhexyl) phthalate	J	L
SOIL-0-9	Chrysene	J	L
SOIL-0-9	Benzo[b]fluoranthene	R	L
SOIL-0-9	Benzo[k]fluoranthene	R	L
SOIL-0-9	Benzo[a]pyrene	R	L
SOIL-0-9	Indeno[1,2,3-cd]pyrene	R	L
SOIL-0-9	Benzo[g,h,i]perylene	J	L
SOIL-0-10	2,4-Dinitrophenol	R	L
SOIL-0-10	Pentachlorophenol	J	L
SOIL-0-10	Butyl benzyl phthalate	J	L
SOIL-0-10	3,3'-Dichlorobenzidine	UJ	L
SOIL-0-10	Bis (2-ethylhexyl) phthalate	J	L
SOIL-0-10	Chrysene	J	L
SOIL-0-10	Benzo[b]fluoranthene	R	L
SOIL-0-10	Benzo[k]fluoranthene	R	L
SOIL-0-10	Benzo[a]pyrene	R	L
SOIL-0-10	Indeno[1,2,3-cd]pyrene	J	L
SOIL-0-10	Benzo[g,h,i]perylene	J	L
SOIL-0-8	2,4-Dinitrophenol	R	L
SOIL-0-8	Pentachlorophenol	J	L
SOIL-0-8	Butyl benzyl phthalate	J	L

Field ID	Analyte	Qualification	Code
SOIL-0-8	3,3'-Dichlorobenzidine	UJ	L
SOIL-0-8	Bis (2-ethylhexyl) phthalate	J	L
SOIL-0-8	Chrysene	J	L
SOIL-0-8	Benzo[b]fluoranthene	J	L
SOIL-0-8	Benzo[k]fluoranthene	R	L
SOIL-0-8	Benzo[a]pyrene	J	L
SOIL-0-8	Indeno[1,2,3-cd]pyrene	J	L
SOIL-0-8	Benzo[g,h,i]perylene	R	L
IDW-SITES	2,4-Dinitrophenol	R	L
IDW-SITES	Pentachlorophenol	UJ	L
IDW-SITES	Butyl benzyl phthalate	R	L
IDW-SITES	3,3'-Dichlorobenzidine	UJ	L
IDW-SITES	Bis (2-ethylhexyl) phthalate	R	L
IDW-SITES	Chrysene	R	L
IDW-SITES	Benzo[b]fluoranthene	R	L
IDW-SITES	Benzo[k]fluoranthene	R	L
IDW-SITES	Benzo[a]pyrene	R	L
IDW-SITES	Indeno[1,2,3-cd]pyrene	R	L
IDW-SITES	Benzo[g,h,i]perylene	R	L
IDW-AT-Q-32	2,4-Dinitrophenol	R	L
IDW-AT-Q-32	Pentachlorophenol	UJ	L
IDW-AT-Q-32	Butyl benzyl phthalate	J	L
IDW-AT-Q-32	3,3'-Dichlorobenzidine	UJ	L
IDW-AT-Q-32	Bis (2-ethylhexyl) phthalate	J	L
IDW-AT-Q-32	Chrysene	R	L
IDW-AT-Q-32	Benzo[b]fluoranthene	R	L
IDW-AT-Q-32	Benzo[k]fluoranthene	R	L
IDW-AT-Q-32	Benzo[a]pyrene	R	L
IDW-AT-Q-32	Indeno[1,2,3-cd]pyrene	R	L
IDW-AT-Q-32	Benzo[g,h,i]perylene	R	L
AT-Q-30-SB-6	2,4-Dinitrophenol	R	L
AT-Q-30-SB-6	Pentachlorophenol	UJ	L
AT-Q-30-SB-6	Butyl benzyl phthalate	R	L
AT-Q-30-SB-6	3,3'-Dichlorobenzidine	UJ	L

Field ID	Analyte	Qualification	Code
AT-Q-30-SB-6	Bis (2-ethylhexyl) phthalate	R	L
AT-Q-30-SB-6	Chrysene	J	L
AT-Q-30-SB-6	Benzo[b]fluoranthene	J	L
AT-Q-30-SB-6	Benzo[k]fluoranthene	J	L
AT-Q-30-SB-6	Benzo[a]pyrene	J	L
AT-Q-30-SB-6	Indeno[1,2,3-cd]pyrene	J	L
AT-Q-30-SB-6	Benzo[g,h,i]perylene	J	L

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?				x		
Note:		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	6			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/31/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 023
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on LCS recoveries.

Field IDs: IDW-SITES IDW-AT-Q-32

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS recovery was outside QC limits

Although it is beyond the scope of this review it should be noted that the CCV and ICAL had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?			x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?					x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries outside the QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-12541	Monochlorobiphenyl	29	30-130
LCS 680-12541	Tetrachlorobiphenyl	37	40-140

Field ID	Analyte	Qualification	Code
IDW-SITES	Monochlorobiphenyl	J	L
IDW-SITES	Tetrachlorobiphenyl	J	L
IDW-AT-Q-32	Monochlorobiphenyl	UJ	L
IDW-AT-Q-32	Tetrachlorobiphenyl	J	L

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		x	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	2			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/31/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 023
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on LCS and MS/MSD recoveries.

Field IDs:	SOIL-0-9	SOIL-0-10	SOIL-0-8
	IDW-SITES	IDW-AT-Q-32	AT-Q-30-SB-6

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated the LCS and MS/MSD had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?						x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD sample AT-Q-30-SB-6 had several recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
AT-Q-30-SB-6	Pentachlorophenol	-26 / -38	71-109

Field ID	Analyte	Qualification	Code
AT-Q-30-SB-6	Pentachlorophenol	J	M

8.0 Laboratory Control Sample (LCS/LCSD) (Code l - LCS recovery Code e - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries outside QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS/LCSD Recoveries	LCS/LCSD Limits
LCS 680-12546	Pentachlorophenol	63 / 75	71-109

Field ID	Analyte	Qualification	Code
SOIL-0-9	Pentachlorophenol	J	L
SOIL-0-10	Pentachlorophenol	J	L
SOIL-0-8	Pentachlorophenol	J	L
IDW-SITES	Pentachlorophenol	J	L
IDW-AT-Q-32	Pentachlorophenol	J	L
AT-Q-30-SB-6*	Pentachlorophenol	J	L

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		x	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		x	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	6			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/31/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 023
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries and method blank contamination.

Field IDs:

SOIL-0-9
SOIL-0-10
SOIL-0-8
IDW-SITES
IDW-AT-Q-32
AT-Q-30-SB-6

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x									x		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C + 2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volume,. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the MS/MSD samples had recoveries outside QC limits

The narrative also indicated that the method blank had detections above the MDL, and holding times outside criteria.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x								x		
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note: Samples were analyzed outside QC limit holding times. Qualifications are listed below.

Field ID	Analyte	Days Late	Qualification	Code
SOIL-0-9	Mercury	6	J	H
SOIL-0-10	Mercury	6	J	H
SOIL-0-8	Mercury	6	J	H
IDW-SITES	Mercury	6	J	H
IDW-AT-Q-32	Mercury	6	J	H
AT-Q-30-SB-6	Mercury	6	J	H

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	X									X		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		X									X	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	X									X		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		X									X	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).	X									X		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: All RPD's were within criteria, sample AT-Q-30-SB-6 was used as the duplicate sample.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)		x								x		
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: Sample AT-Q-30-SB-6 was spiked and analyzed. Qualifications are listed below.

Field ID	Analyte	MS/MSD recoveries	MS/MSD Limits
AT-Q-30-SB-6	Antimony	57 / 60	75-125
AT-Q-30-SB-6	Copper	164 / 120	75-125
AT-Q-30-SB-6	Potassium	135 / 84	75-125
AT-Q-30-SB-6	Zinc	72 / 89	75-125

Field ID	Analyte	Qualification	Code
AT-Q-30-SB-6	Antimony	J	M
AT-Q-30-SB-6	Copper	J	M
AT-Q-30-SB-6	Potassium	J	M
AT-Q-30-SB-6	Zinc	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Samples AT-Q-30-SB-6 and SOIL-0-9 were diluted and analyzed, all %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		x									x	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)			x									x

Note:

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	6		0		0		6
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		####		####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	8/31/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 023
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries

Field IDs:	SOIL-0-9	SOIL-0-10	SOIL-0-8
	IDW-SITES	IDW-AT-Q-32	AT-Q-30-SB-6

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD sample AT-Q-30-SB-6 had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
AT-Q-30-SB-6	Ammonia	42 / 44	75-125

Field ID	Analyte	Qualification	Code
AT-Q-30-SB-6	Ammonia	J	M

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		x	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	6			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/5/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 024
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No analytes required qualification, based on this data review.

Field IDs:

AT-Q-22-SB-6-FB	TB-24	AT-Q-30-SS-1FB
TB-25	TB-26	TB-A-7
TB-27		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix / Preserved / Aromatic / All others			
	Aqueous / No / 7 days / 14 days			
	Yes / 14 days / 14 days			
	Soil/Sediment / 4 $^{o}C \pm 2\ ^{o}C$ / 14 days / 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?						x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.						
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	7			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/5/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 024
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG

Field IDs: AT-Q-22-SB-6-FB AT-Q-30-SS-1-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?			x		
7.3	Are more than one of either fraction outside the acceptance criteria?				x	
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?					x
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?					x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.					
		> UCL	10% to LCL	< 10%		
	Positive	J	J	J		
	Non-detect	None	UJ	R		

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	2			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/5/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 024
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No qualifications were required in this SDG.

Field IDs: AT-Q-22-SB-6-FB AT-Q-30-SS-1-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?						x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		x	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	2			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/5/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 024
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs: AT-Q-22-SB-6-FB AT-Q-30-SS-1-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?						x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		x	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	2			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/5/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 024
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification

Field IDs: AT-Q-22-SB-6-FB

AT-Q-30-SS-1-FB

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x									x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C ± 2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note:

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x

	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		x									x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		x									x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note:

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)												
	< -IDL > IDL < 50% 50% - 79% > 120%												
	UJ(-) J(+) R(+/-) J(+)/UJ(-) J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.		x									x	
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x									x
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).			x									x
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note:

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.		x									x	
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x									x
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)			x									x
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note:

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?		x										
10.2	Was a five-fold dilution performed?			x									
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).			x									

Note:

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		x									x	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)			x									x

Note:

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	2		0		0		2
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		#####		#####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/5/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 024
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs: AT-Q-22-SB-6-FB AT-Q-30-SS-1-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		x	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	2			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/7/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 025
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on LCS, surrogate, and internal standard recoveries, and due to method blank detections.

Field IDs:

AT-Q-22-SB-6	AT-Q-19-SS-1.5	AT-Q-22-SS-0.5
AT-Q-30-SS-1	AT-Q-30-SS-1-D	AT-Q-29-SS-1
AT-P-5-WS-12	AT-P-50-SB-6	AT-P-3-SS-0.5
AT-P-3-WS-10	AT-P-3-SB-6	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS, MS/MSD, surrogate, and internal standard recoveries were outside QC limits. The narrative also indicated that the method blank had detections above the MDL.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?				x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	$4\ ^{O}C \pm 2\ ^{O}C$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	x		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: Methylene chloride was detected in one method blank

Field ID	Analyte	Qualification	New RL	Code
AT-Q-19-SS-1.5RE	Methylene Chloride	U	-	Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?						x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.						
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
AT-Q-22-SB-6	4-Bromodifluorobenzene	61	68-121
AT-Q-22-SB-6RE	4-Bromodifluorobenzene	44	68-121
AT-Q-19-SS-1.5	4-Bromodifluorobenzene	43	68-121
AT-Q-19-SS-1.5RE	4-Bromodifluorobenzene	44	68-121
AT-P-5-SB-6	4-Bromodifluorobenzene	60	68-121
AT-P-5-SB-6RE	4-Bromodifluorobenzene	65	68-121

Field ID	Analyte	Qualification	Code
AT-Q-22-SB-6	All VOCs	J/UJ	S
AT-Q-22-SB-6RE	All VOCs	J/UJ	S
AT-Q-19-SS-1.5	All VOCs	J/UJ	S
AT-Q-19-SS-1.5RE	All VOCs	J/UJ	S
AT-P-5-SB-6	All VOCs	J/UJ	S
AT-P-5-SB-6RE	All VOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD had one analyte outside QC limits; however the corresponding LCS was within QC limits. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: Several LCS analytes were outside QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-13802	Chloroethane	281	20-140
LCS 680-13802	1,2-Dichloroethane	134	65-133
LCS 680-13802	Bromodichloromethane	142	74-128
LCS 680-14230	Chloroethane	545	20-140
LCS 680-14230	Chlorobenzene	80	81-120
LCS 680-14387	Carbon Tetrachloride	15	62-140
LCS 680-14387	1,1,2-Trichloroethane	5	76-120
LCS 680-14557	1,1,1-Trichloroethane	145	58-139
LCS 680-14908	Styrene	78	80-118
LCS 680-15718	Tetrachloroethene	75	79-132
LCS 680-15718	Chlorobenzene	78	81-120
LCS 680-15718	Styrene	79	80-118

Field ID	Analyte	Qualification	Code
AT-P-5-SB-6RE	Chlorobenzene	J	L
AT-Q-22-SB-6RE	Carbon Tetrachloride	UJ	L
AT-Q-22-SB-6RE	1,1,2-Trichloroethane	UJ	L
AT-Q-19-SS-1.5RE	Carbon Tetrachloride	UJ	L
AT-Q-19-SS-1.5RE	1,1,2-Trichloroethane	UJ	L
AT-P-3-WS-10	Styrene	J	L
AT-P-3-WS-10DL	Styrene	UJ	L
AT-P-3-SB-6	Styrene	UJ	L
AT-P-3-SS-0.5	Tetrachloroethene	UJ	L
AT-P-3-SS-0.5	Chlorobenzene	UJ	L
AT-P-3-SS-0.5	Styrene	UJ	L
AT-P-5-SS-0.5	Tetrachloroethene	J	L
AT-P-5-SS-0.5	Chlorobenzene	J	L
AT-P-5-SS-0.5	Styrene	UJ	L

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?					x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: Several internal standards had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	IS Recovery High/Low	Qualification	Code
AT-Q-22-SB-6	All VOCs	Low	J/UJ	I
AT-Q-19-SS-1.5	All VOCs	Low	J/UJ	I
AT-P-5-SB-6	All VOCs	Low	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-30-SS-1 was the parent sample of AT-Q-30SS-1-D.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	11			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/7/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 025
		Review Level:	Level III

Major Anomalies:

Samples were rejected based on LCS recoveries.

Minor Anomalies:

Samples were qualified based on LCS, surrogate, and internal standard recoveries.

Field IDs:

AT-Q-22-SB-6	AT-Q-19-SS-1.5	AT-Q-22-SS-0.5
AT-Q-30-SS-1	AT-Q-30-SS-1-D	AT-Q-29-SS-1
AT-P-5-WS-12	AT-P-5-SB-6	AT-P-3-SS-0.5
AT-P-5-SS-0.5	AT-P-3-WS-10	AT-P-3-SB-6

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The MS/MSD, LCS, surrogate, and internal standard recoveries were outside QC limits.
The method blank had detections above the MDL.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	x		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: Pentachlorophenol recovered above the MDL in the method blank; however, pentachlorophenol was reported non-detect for all associated samples. No qualification of data was required.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?		x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: All samples had surrogate recoveries outside QC limits. Qualifications are listed below. A list of recoveries can be submitted upon request.

Field ID	Analyte	Qualification	Code
AT-Q-22-SB-6	All SVOCs	J/UJ	S
AT-Q-19-SS-1.5	All SVOCs	J/UJ	S
AT-Q-22-SS-0.5	All Acid/fraction analytes	J/UJ	S
AT-Q-30-SS-1	All SVOCs	J/UJ	S
AT-Q-30-SS-1-D	All SVOCs	J/UJ	S
AT-Q-29-SS-1	All Acid/fraction analytes	J/UJ	S
AT-P-5-WS-12	All SVOCs	J/UJ	S
AT-P-5-SB-6	All Acid/fraction analytes	J/UJ	S
AT-P-3-SS-0.5	All SVOCs	J/UJ	S
AT-P-5-SS-0.5	All SVOCs	J/UJ	S
AT-P-3-WS-10	All SVOCs	J/UJ	S
AT-P-3-SB-6	All SVOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Several analytes were outside QC limits for the MS/MSD sample, however the LCS was within QC limits; therefore, no qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note: The LCS had two analyte recoveries outside QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-13397	2,4-Dinitrophenol	0	1-131
LCS 680-13397	Pentachlorophenol	11	27-116

Field ID	Analyte	Qualification	Code
AT-Q-22-SB-6	2,4-Dinitrophenol	R	L
AT-Q-22-SB-6	Pentachlorophenol	UJ	L
AT-Q-19-SS-1.5	2,4-Dinitrophenol	R	L
AT-Q-19-SS-1.5	Pentachlorophenol	UJ	L
AT-Q-22-SS-0.5	2,4-Dinitrophenol	R	L
AT-Q-22-SS-0.5	Pentachlorophenol	UJ	L
AT-Q-30-SS-1	2,4-Dinitrophenol	R	L
AT-Q-30-SS-1	Pentachlorophenol	UJ	L
AT-Q-30-SS-1-D	2,4-Dinitrophenol	R	L
AT-Q-30-SS-1-D	Pentachlorophenol	UJ	L
AT-Q-29-SS-1	2,4-Dinitrophenol	R	L
AT-Q-29-SS-1	Pentachlorophenol	UJ	L
AT-P-5-WS-12	2,4-Dinitrophenol	R	L
AT-P-5-WS-12	Pentachlorophenol	UJ	L
AT-P-5-SB-6	2,4-Dinitrophenol	R	L
AT-P-5-SB-6	Pentachlorophenol	UJ	L
AT-P-3-SS-0.5	2,4-Dinitrophenol	R	L
AT-P-3-SS-0.5	Pentachlorophenol	UJ	L
AT-P-5-SS-0.5	2,4-Dinitrophenol	R	L
AT-P-5-SS-0.5	Pentachlorophenol	UJ	L
AT-P-3-WS-10	2,4-Dinitrophenol	R	L
AT-P-3-WS-10	Pentachlorophenol	UJ	L
AT-P-3-SB-6	2,4-Dinitrophenol	R	L
AT-P-3-SB-6	Pentachlorophenol	UJ	L

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?					x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?					x	
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: Several samples had internal standard recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	IS recovery High/Low	Code
AT-Q-22-SS-0.5	All SVOCs	J/UJ	Low	I
AT-Q-22-SB-6	All detected SVOCs	J	High	I
AT-Q-29-SS-1	All detected SVOCs	J	High	I
AT-P-5-WS-12	All detected SVOCs	J	High	I
AT-P-3-WS-10	All detected SVOCs	J	High	I
AT-P-3-SB-6	All detected SVOCs	J	High	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-30-SS-1 was the parent sample of AT-Q-30-SS-1-D

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	12			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	12			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**98.5**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/7/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 025
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on surrogate and LCS recoveries.

Field IDs:	AT-Q-22-SB-6	AT-Q-22-SS-0.5	AT-Q-29-SS-1
	AT-P-5-WS-12	AT-P-3-WS-10	AT-P-3-SB-1

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the MS/MSD, LCS, and surrogate recoveries were outside QC limits
The narrative also indicated that the method blank had analytes detected above the MDL.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The method blank for PCBs had a detection above the MDL. All associated samples were either non-detect or had recoveries greater than 5X the blank contamination. No qualification of data was required.

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?			x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?					x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
AT-P-3-WS-10	Decachlorobiphenyl-13C12	7	30-130
AT-P-3-SB-6	Decachlorobiphenyl-13C12	26	30-130

Field ID	Analyte	Qualification	Code
AT-P-3-WS-10	All PCBs	J/UJ	S
AT-P-3-SB-6	All PCBs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may			

Note: The MS/MSD sample AT-Q-22-SS-0.5 had recoveries below QC limits for all analytes. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
AT-Q-22-SS-0.5	All PCBs	J/UJ	M

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries outside the QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS Recovery	LCS Limits
LCS 680-13784	Monochlorobihpenyl	29	30-130
LCS 680-13784	Tetrachlorobiphenyl	33	40-140
LCS 680-13784	Pentachlorobiphenyl	34	40-140
LCS 680-13784	Hexachlorobiphenyl	34	40-140
LCS 680-13784	Heptachlorobiphenyl	35	40-140
LCS 680-13784	Octachlorobiphenyl	35	40-140

Field ID	Analyte	Qualification	Code
AT-Q-22-SB-6	Monochlorobihpenyl	UJ	L
AT-Q-22-SB-6	Tetrachlorobiphenyl	UJ	L
AT-Q-22-SB-6	Pentachlorobiphenyl	UJ	L
AT-Q-22-SB-6	Hexachlorobiphenyl	UJ	L
AT-Q-22-SB-6	Heptachlorobiphenyl	UJ	L
AT-Q-22-SB-6	Octachlorobiphenyl	UJ	L
AT-Q-22-SS-0.5	Monochlorobihpenyl	UJ	L
AT-Q-22-SS-0.5	Tetrachlorobiphenyl	UJ	L
AT-Q-22-SS-0.5	Pentachlorobiphenyl	UJ	L
AT-Q-22-SS-0.5	Hexachlorobiphenyl	UJ	L
AT-Q-22-SS-0.5	Heptachlorobiphenyl	UJ	L
AT-Q-22-SS-0.5	Octachlorobiphenyl	UJ	L
AT-Q-29-SS-1	Monochlorobihpenyl	UJ	L
AT-Q-29-SS-1	Tetrachlorobiphenyl	UJ	L
AT-Q-29-SS-1	Pentachlorobiphenyl	UJ	L
AT-Q-29-SS-1	Hexachlorobiphenyl	UJ	L
AT-Q-29-SS-1	Heptachlorobiphenyl	UJ	L
AT-Q-29-SS-1	Octachlorobiphenyl	UJ	L
AT-P-5-WS-12	Monochlorobihpenyl	J	L
AT-P-5-WS-12	Tetrachlorobiphenyl	J	L
AT-P-5-WS-12	Pentachlorobiphenyl	UJ	L
AT-P-5-WS-12	Hexachlorobiphenyl	J	L
AT-P-5-WS-12	Heptachlorobiphenyl	J	L
AT-P-5-WS-12	Octachlorobiphenyl	J	L
AT-P-5-WS-12DL	Monochlorobihpenyl	J	L

Field ID	Analyte	Qualification	Code
AT-P-5-WS-12DL	Tetrachlorobiphenyl	UJ	L
AT-P-5-WS-12DL	Pentachlorobiphenyl	J	L
AT-P-5-WS-12DL	Hexachlorobiphenyl	J	L
AT-P-5-WS-12DL	Heptachlorobiphenyl	J	L
AT-P-5-WS-12DL	Octachlorobiphenyl	J	L
AT-P-3-WS-10	Monochlorobihpenyl	J	L
AT-P-3-WS-10	Tetrachlorobiphenyl	UJ	L
AT-P-3-WS-10	Pentachlorobiphenyl	J	L
AT-P-3-WS-10	Hexachlorobiphenyl	J	L
AT-P-3-WS-10	Heptachlorobiphenyl	J	L
AT-P-3-WS-10	Octachlorobiphenyl	J	L
AT-P-3-WS-10DL	Monochlorobihpenyl	UJ	L
AT-P-3-WS-10DL	Tetrachlorobiphenyl	J	L
AT-P-3-WS-10DL	Pentachlorobiphenyl	J	L
AT-P-3-WS-10DL	Hexachlorobiphenyl	J	L
AT-P-3-WS-10DL	Heptachlorobiphenyl	UJ	L
AT-P-3-WS-10DL	Octachlorobiphenyl	UJ	L
AT-P-3-SB-6	Monochlorobihpenyl	UJ	L
AT-P-3-SB-6	Tetrachlorobiphenyl	J	L
AT-P-3-SB-6	Pentachlorobiphenyl	J	L
AT-P-3-SB-6	Hexachlorobiphenyl	J	L
AT-P-3-SB-6	Heptachlorobiphenyl	J	L
AT-P-3-SB-6	Octachlorobiphenyl	UJ	L

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		x	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	6			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/8/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 025
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs:

AT-Q-22-SB-6	AT-Q-19-SS-1.5	AT-Q-22-SS-0.5
AT-Q-30-SS-1	AT-Q-30-SS-1-D	AT-Q-29-SS-1
AT-P-5-WS-12	AT-P-5-SB-6	AT-P-3-SS-0.5
AT-P-5-SS-0.5	AT-P-3-WS-10	AT-P-3-SB-6

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	X		

Note: The laboratory case narrative indicated the MS/MSD had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?			x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD sample AT-Q-22-SS-0.5 had recoveries outside QC limits; however, the LCS recoveries were within QC limits. No qualification of data was required.

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-30-SS-1 was the parent sample for AT-Q-30-SS-1-D

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	12			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/8/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 025
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries and field duplicate RPDs.

Field IDs:

AT-Q-22-SB-6	AT-Q-19-SS-1.5	AT-Q-22-0.5
AT-Q-30-SS-1	AT-Q-30-SS-1-D	AT-Q-29-SS-1
AT-P-5-WS-12	AT-P-5-SB-6	AT-P-3-SS-0.5
AT-P-5-SS-0.5	AT-P-3-WS-10	AT-P-3-SB-6

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	X									X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X									X		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	X										X	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{o}C \pm 2\ ^{o}C$)	X									X		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	X									X		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

The narrative also indicated that the method blanks had recoveries above the MDL.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes				Spiked analytes (ICS AB analytes)								
	< -IDL	> IDL		< 50%	50% - 79%	> 120%							
	UJ(-)	J(+)		R(+/-)	J(+)/UJ(-)	J(+)							

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).	x									x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Samples AT-Q-22-SS-0.5 and AT-P-3-SB-6 were analyzed in duplicate.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)		x									x	
	%R > 125%	30% < %R < 74%	%R < 30%										
	Positive J	J	J										
	Non-detect None	UJ	R										

Note: Sample AT-Q-22-SS-0.5 was spiked and analyzed as the MS/MSD. The MS/MSD sample had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
AT-Q-22-SS-0.5	Antimony	50 / 47	75-125
AT-Q-22-SS-0.5	Barium	73 / 84	75-125
AT-Q-22-SS-0.5	Zinc	95 / 147	75-125
AT-Q-22-SS-0.5	Mercury	-8 / 72	80-120

Field ID	Analyte	Qualifications	Code
AT-Q-22-SS-0.5	Antimony	J	M
AT-Q-22-SS-0.5	Barium	J	M
AT-Q-22-SS-0.5	Zinc	J	M
AT-Q-22-SS-0.5	Mercury	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Samples AT-P-3-SS-0.5, AT-Q-22-SS-0.5, and AT-P-3-SB-6 were diluted and analyzed, all %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)		x								x		

Note: Sample AT-Q-30-SS-1 was the parent sample for AT-Q-30-SS-1-D, %RPD was outside QC limits. Qualifications are listed below.

Field ID	Analyte	Qualifications	Code
AT-Q-30-SS-1	Zinc	J	F
AT-q-30-SS-1-D	Zinc	J	F

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)												
13.2	Number of samples:	12			0			0			12		
13.3	Number of target compounds in each analysis:	22			0			0			1		
13.4	Number of results rejected and not reported:	0			0			0			0		
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)												
	% Completeness	**100**			####			####			**100**		

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/8/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 025
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:

AT-Q-22-SB-6	AT-Q-19-SS-1.5	AT-Q-22-SS-0.5
AT-Q-30-SS-1	AT-Q-30-SS-1-D	AT-Q-29-SS-1
AT-P-5-WS-12	AT-P-5-SB-6	AT-P-3-SS-0.5
AT-P-5-SS-0.5	AT-P-3-WS-10	AT-P-3-SB-6

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Met

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD sample AT-Q-22-SS-0.5 had all recoveries within QC limits.

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?	x		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-30-SS-1 was the parent sample of AT-Q-30-SS-1-D.

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	x		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	x		

Note: Sample AT-P-3-SB-6 was analyzed as the laboratory duplicate sample.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	12			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/8/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 026
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on LCS recoveries, field duplicate RPDs, and holding time criteria.

Field IDs:

SA-Q-6-WS-16	AT-Q-31-WS-12	SA-Q-3-WS-12
AT-Q-28-WS-16	SA-0-1-SB-3	SA-O-3-WS-9
SA-O-4-SB-6	SA-O-2-WS-9	SA-O-2-WS-9-D
AT-Q-25-WS-9	SA-P-1-WS-8	SA-P-3-WS-14
SA-P-2-WS-9		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the method blank had detections above the MDL, and the LCS had recoveries outside QC limits.
The narrative also indicated that samples were analyzed outside holding time criteria.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?					x	
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).				x		
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 $^{o}C \pm 2\ ^{o}C$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note: Several samples were analyzed outside holding times. Qualifications are listed below.

Field ID	Analyte	Qualification	Days late	Code
SA-Q-6-WS-16	All VOCs	J/UJ	5	H
AT-Q-31-WS-12	All VOCs	J/UJ	5	H
SA-Q-3-WS-12	All VOCs	J/UJ	5	H
AT-Q-28-WS-16	All VOCs	J/UJ	5	H
SA-0-1-SB-3	All VOCs	J/UJ	5	H

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	x		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The method blank had detections of methylene chloride above the MDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
SA-Q-6-WS-16	Methylene chloride	U	54	Z
AT-Q-28-WS-16	Methylene chloride	U	-	Z
SA-O-4-SB-6	Methylene chloride	U	-	Z
AT-Q-25-WS-9	Methylene chloride	U	-	Z
SA-P-2-WS-9	Methylene chloride	U	-	Z
AT-Q-31-WS-12	Methylene chloride	U	54	Z
SA-0-1-SB-3	Methylene chloride	U	-	Z
SA-O-2-WS-9	Methylene chloride	U	-	Z
SA-P-1-WS-8	Methylene chloride	U	-	Z
SA-Q-3-WS-12	Methylene chloride	U	-	Z
SA-O-3-WS-9	Methylene chloride	U	-	Z
SA-O-2-WS-9-D	Methylene chloride	U	-	Z
SA-P-3-WS-14	Methylene chloride	U	-	Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?			x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?					x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.					
		> UCL	10% to LCL	< 10%		
	Positive	J	J	J		
	Non-detect	None	UJ	R		

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		x	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample SA-O-2-WS-9 was the parent sample of SA-O-2-WS-9-D, %RPD values were outside QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
SA-O-2-WS-9	Benzene	J	F
SA-O-2-WS-9	Toluene	J	F
SA-O-2-WS-9	Chlorobenzene	J	F
SA-O-2-WS-9	Ethylbenzene	J	F
SA-O-2-WS-9	Xylenes, Total	J	F
SA-O-2-WS-9-D	Benzene	J	F
SA-O-2-WS-9-D	Toluene	J	F
SA-O-2-WS-9-D	Chlorobenzene	J	F
SA-O-2-WS-9-D	Ethylbenzene	J	F
SA-O-2-WS-9-D	Xylenes, Total	J	F

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	13			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/9/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 026
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on surrogate and internal standard recoveries.

Field IDs:

SA-Q-6-WS-16	AT-Q-31-WS-12	SA-Q-3-WS-12
AT-Q-28-WS-16	SA-0-1-SB-3	SA-O-3-WS-9
SA-O-4-SB-6	SA-O-2-WS-9	SA-O-2-WS-9-D
AT-Q-25-WS-9	SA-P-1-WS-8	SA-P-3-WS-14
SA-P-2-WS-9		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The surrogates and internal standards had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: All samples were re-extracted 25 days outside of holding time. The original analyses will be used.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?					x	
7.3	Are more than one of either fraction outside the acceptance criteria?				x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?					x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?						
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.						
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note: Several samples had surrogate recoveries below QC limits. Qualifications are listed below. Surrogate recoveries can be submitted upon request as needed.

Field ID	Analyte	Qualification	Code
SA-Q-6-WS-16	All Acid/fraction SVOCs	J/UJ	S
SA-Q-6-WS-16RE	All Acid/fraction SVOCs	J/UJ	S
SA-Q-3-WS-12	All Acid/fraction SVOCs	J/UJ	S
SA-Q-3-WS-12-RE	All Acid/fraction SVOCs	J/UJ	S
AT-Q-28-WS-16RE	All Acid/fraction SVOCs	J/UJ	S
AT-Q-25-WS-9	All SVOCs	J/UJ	S
SA-P-1-WS-8	All SVOCs	J/UJ	S
SA-P-1-WS-8RE	All Acid/fraction SVOCs	J/UJ	S
SA-P-3-WS-14	All SVOCs	J/UJ	S
SA-P-3-WS-14RE	All Acid/fraction SVOCs	J/UJ	S
SA-P-2-WS-9RE	All Acid/fraction SVOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note:

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?		x	
	Area > +100% / Area < -50% / Area < -10%			
	Positive: J / J / J			
	Non-detect: None / UJ / R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: Several samples had internal standards outside QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	IS Recovery High/Low	Code
SA-0-1-SB-3	All SVOCs	J/UJ	Low	I
SA-O-2-WS-9	All SVOCs	J/UJ	Low	I
SA-O-2-WS-9-D	All SVOCs	J/UJ	Low	I
AT-Q-25-WS-9	All SVOCs	J/UJ	Low	I
SA-P-1-WS-8	All SVOCs	J/UJ	Low	I
SA-P-3-WS-14	All SVOCs	J/UJ	Low	I
SA-Q-6-WS-16	All SVOCs	J/UJ	Low	I
SA-O-3-WS-9	All SVOCs	J/UJ	Low	I
SA-Q-3-WS-12	All SVOCs	J/UJ	Low	I
AT-Q-28-WS-16	All SVOCs	J/UJ	Low	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample SA-O-2-WS-9-D was submitted as the duplicate sample of SA-O-2-WS-9.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	13			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/8/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 026
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on LCS and surrogate recoveries, and on method blank contamination.

Field IDs:

SA-Q-6-WS-16	AT-Q-31-WS-12	SA-Q-3-WS-12
AT-Q-28-WS-16	SA-0-1-SB-3	SA-O-3-WS-9
SA-O-4-SB-6	SA-O-2-WS-9	SA-O-2-WS-9-D
AT-Q-25-WS-9	SA-P-1-WS-8	SA-P-3-WS-14
SA-P-2-WS-9		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS and surrogate recoveries were outside QC limits
The narrative also indicated that the method blank had detections above the MDL.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?	x		
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The PCB method blank had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
SA-O-4-SB-6	Tetrachlorobiphenyl	U	-	X

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?					x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-0-1-SB-3	DCB-Decachlorobiphenyl	14	30-150
AT-Q-25-WS-9	DCB-Decachlorobiphenyl	8	30-150
SA-P-1-WS-8	DCB-Decachlorobiphenyl	15	30-150
SA-P-3-WS-14	DCB-Decachlorobiphenyl	16	30-150
SA-P-2-WS-9	DCB-Decachlorobiphenyl	14	30-150

Field ID	Analyte	Qualification	Code
SA-0-1-SB-3	All Pesticides	J/UJ	S
AT-Q-25-WS-9	All Pesticides	J/UJ	S
SA-P-1-WS-8	All Pesticides	J/UJ	S
SA-P-3-WS-14	All Pesticides	J/UJ	S
SA-P-2-WS-9	All Pesticides	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10%			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries outside the QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS/LCSD Recoveries	LCS/LCSD Limits
LCS 680-13860	Endosulfan II	28 / 31	40-123

Field ID	Analyte	Qualification	Code
SA-Q-6-WS-16	Endosulfan II	UJ	L
AT-Q-28-WS-16	Endosulfan II	UJ	L
SA-O-4-SB-6	Endosulfan II	UJ	L
AT-Q-25-WS-9	Endosulfan II	UJ	L
SA-P-2-WS-9	Endosulfan II	UJ	L
AT-Q-31-WS-12	Endosulfan II	UJ	L
SA-0-1-SB-3	Endosulfan II	UJ	L
SA-O-2-WS-9	Endosulfan II	UJ	L
SA-P-1-WS-8	Endosulfan II	UJ	L
SA-Q-3-WS-12	Endosulfan II	UJ	L
SA-O-3-WS-9	Endosulfan II	UJ	L
SA-O-2-WS-9-D	Endosulfan II	UJ	L
SA-P-3-WS-14	Endosulfan II	UJ	L

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?	x		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample SA-O-2-WS-9-D was submitted as the duplicate sample to SA-O-2-WS-9.

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	13			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/8/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 026
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on surrogate recoveries.

Field IDs:

SA-Q-6-WS-16	AT-Q-31-WS-12	SA-Q-3-WS-12
AT-Q-28-WS-16	SA-0-1-SB-3	SA-O-3-WS-9
SA-O-4-SB-6	SA-O-2-WS-9	SA-O-2-WS-9-D
AT-Q-25-WS-9	SA-P-1-WS-8	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the surrogates had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?						x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note: One sample had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
AT-Q-28-WS-16	DCAA	28	35-134

Field ID	Analyte	Qualifications	Code
AT-Q-28-WS-16	All Herbicides	J/UJ	S

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample SA-O-2-WS-9-D was submitted as the duplicate for sample SA-O-2-WS-9.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	11			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/9/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 026
		Review Level:	Level III

Major Anomolies:

No samples were rejected

Minor Anomolies:

Samples were qualified based method blank contamination, and hold time criteria.

Field IDs:

SA-Q-6-WS-16	AT-Q-31-WS-12	SA-Q-3-WS-12
AT-Q-28-WS-16	SA-0-1-SB-3	SA-O-3-WS-9
SA-O-4-SB-6	SA-O-2-WS-9	SA-O-2-WS-9-D
AT-Q-25-WS-9	SA-P-1-WS-8	SA-P-3-WS-14
SA-P-2-WS-9		

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x										x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C ± 2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the method blank had detections above the MDL, and that mercury was analyzed outside hold time criteria

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x								x		
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note: Holding times for mercury were outside QC limits. Qualifications are listed below.

Field ID	Analytes	Qualification	Days late	Code
SA-Q-6-WS-16	Mercury	UJ	12	H
AT-Q-31-WS-12	Mercury	UJ	12	H
SA-Q-3-WS-12	Mercury	UJ	12	H
AT-Q-28-WS-16	Mercury	UJ	12	H
SA-0-1-SB-3	Mercury	J	12	H
SA-O-3-WS-9	Mercury	J	12	H
SA-O-4-SB-6	Mercury	J	12	H
SA-O-2-WS-9	Mercury	UJ	12	H
SA-O-2-WS-9-D	Mercury	UJ	12	H
AT-Q-25-WS-9	Mercury	UJ	12	H
SA-P-1-WS-8	Mercury	UJ	12	H
SA-P-3-WS-14	Mercury	UJ	12	H
SA-P-2-WS-9	Mercury	UJ	12	H

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
SA-Q-6-WS-16	Aluminum	U	-	P
SA-Q-6-WS-16	Copper	U	-	P
SA-Q-6-WS-16	Selenium	U	-	P
AT-Q-31-WS-12	Aluminum	U	280	P
AT-Q-31-WS-12	Copper	U	-	P
AT-Q-31-WS-12	Selenium	U	-	P
SA-Q-3-WS-12	Copper	U	-	P
SA-Q-3-WS-12	Selenium	U	-	P
AT-Q-28-WS-16	Selenium	U	-	P
SA-0-1-SB-3	Selenium	U	16	P
SA-O-3-WS-9	Aluminum	U	210	P
SA-O-3-WS-9	Selenium	U	24	P
SA-O-4-SB-6	Selenium	U	-	P
SA-O-2-WS-9	Copper	U	-	P
SA-O-2-WS-9	Selenium	U	-	P
SA-O-2-WS-9-D	Aluminum	U	310	P
SA-O-2-WS-9-D	Copper	U	-	P
AT-Q-25-WS-9	Aluminum	U	310	P
AT-Q-25-WS-9	Copper	U	-	P
AT-Q-25-WS-9	Selenium	U	-	P
SA-P-1-WS-8	Aluminum	U	230	P
SA-P-1-WS-8	Copper	U	-	P
SA-P-1-WS-8	Selenium	U	-	P
SA-P-3-WS-14	Aluminum	U	210	P
SA-P-3-WS-14	Copper	U	-	P
SA-P-2-WS-9	Copper	U	-	P
SA-P-2-WS-9	Selenium	U	-	P

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).			x									x
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: The laboratory dulicate was not a sample in this SDG.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.		x									x	
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x									x
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)			x									x
	R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note:

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Samples SA-Q-6-WS-16, SA-Q-3-WS-12, and SA-P-3-WS-14 were diluted and analyzed, all %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)	x									x		

Note: Sample SA-O-2-WS-9-D was submitted as the duplicate for sample SA-O-2-WS-9

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	13		0		0		13
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		#####		#####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/8/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 026
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on blank contamination.

Field IDs:

SA-Q-6-WS-16	AT-Q-31-WS-12	SA-Q-3-WS-12
AT-Q-28-WS-16	SA-0-1-SB-3	SA-O-3-WS-9
SA-O-4-SB-6	SA-O-2-WS-9	SA-O-2-WS-9-D
AT-Q-25-WS-9	SA-P-1-WS-8	SA-P-3-WS-14
SA-P-2-WS-9		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the method blank had detections above the MDL.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?	x		
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The method blank had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
SA-P-3-WS-14	Ammonia	U	-	Z

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?	x		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample SA-O-2-WS-9-D was submitted as the duplicate for sample SA-O-2-WS-9.

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	x		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

Note: The laboratory duplicate analyzed was from a different client.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	13			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/5/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 027
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on method blank contamination.

Field IDs:	AT-Q-21-WS-8	AT-Q-21-WS-8-D	SA-S-2-SB-4
	AT-P-4-SB-4-D	SA-S-1-WS-9	AT-Q-33-SB-5
	AT-Q-35-WS-8	AT-Q-32-SB-6	AT-P-4-SB-4

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: The laboratory case narrative indicated that the method blank had detections above the MDL.
The narrative also indicated that the LCS had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix / Preserved / Aromatic / All others			
	Aqueous / No / 7 days / 14 days			
	Yes / 14 days / 14 days			
	Soil/Sediment / 4 $^{o}C \pm 2\ ^{o}C$ / 14 days / 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	x		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The method blank had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
AT-Q-21-WS-8	Methylene Chloride	U	-	Z
AT-Q-21-WS-8	Methyl Isobutyl ketone	U	-	Z
AT-Q-21-WS-8-D	Methylene Chloride	U	-	Z
AT-Q-21-WS-8-D	Methyl Isobutyl ketone	U	-	Z
SA-S-2-SB-4	Methylene Chloride	U	-	Z
SA-S-1-WS-9	Methylene Chloride	U	-	Z
AT-Q-32-SB-6	Methylene Chloride	U	-	Z
AT-Q-32-SB-6	Methyl Isobutyl ketone	U	-	Z
AT-P-4-SB-4	Methylene Chloride	U	-	Z
AT-P-4-SB-4-D	Methylene Chloride	U	-	Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries above the QC limits; however, all associated samples were reported non-detect. No qualifications were required.

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples AT-Q-21-WS-8-D and AT-P-4-SB-4-D were submitted as duplicate samples for AT-Q-21-WS-8 and AT-P-4-SB-4.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	9			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/6/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 027
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on LCS recoveries.

Field IDs:

AT-Q-21-WS-8	AT-Q-21-WS-8-D	SA-S-2-SB-4
SA-S-1-WS-9	AT-Q-33-SB-5	AT-Q-35-WS-8
AT-Q-32-SB-6	AT-P-4-SB-4	AT-P-4-SB-4-D

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The LCS/LCSD had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?	x		
7.3	Are more than one of either fraction outside the acceptance criteria?		x	
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?			x
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note: The LCS/LCSD had 53 out of 64 analyte recoveries below QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
AT-Q-33-SB-5	All SVOCs	J/UJ	L
AT-Q-35-WS-8	All SVOCs	J/UJ	L
AT-P-4-SB-4	All SVOCs	J/UJ	L
AT-P-4-SB-4-D	All SVOCs	J/UJ	L
At-P-4-SB-4-DDL	All SVOCs	J/UJ	L

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?	x		
	Area > +100% Area < -50% Area < -10%			
	Positive J J J			
	Non-detect None UJ R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples AT-Q-21-WS-8-D and AT-P-4-SB-4-D were submitted as duplicate samples for AT-Q-21-WS-8 and AT-P-4-SB-4.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	9			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/5/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 027
		Review Level:	Level III

Major Anomalies:

Samples were rejected based on surrogate and LCS recoveries.

Minor Anomalies:

Samples were qualified based on surrogate and LCS recoveries.

Field IDs:			
	AT-Q-21-WS-8	AT-Q-21-WS-8-D	SA-S-2-SB-4
	SA-A-1-WS-9	AT-Q-33-SB-5	AT-Q-35-WS-8
	AT-Q-32-SB-6	AT-P-4-SB-4	AT-P-4-SB-4-D

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS and surrogates had recoveries outside QC limits
The narrative also indicated that the method blank had detections above the MDL.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?	x		
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The method blank sample had detections above the MDL; however all associated data were reported non-detect or at greater than 5X the blank concentrations. No qualification of data was required.

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	x		
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-S-2-SB-4	DCB Decachlorobiphenyl	8	30-150
AT-Q-33-SB-5	DCB Decachlorobiphenyl	25	30-150

Field ID	Analyte	Qualification	Code
SA-S-2-SB-4	All Pesticides	J/R	S
AT-Q-33-SB-5	All Pesticides	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries outside QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-14568	Dieldrin	20	38-136
LCS 680-14568	Endrin	0	34-146

Field ID	Analyte	Qualification	Code
AT-Q-21-WS-8	Dieldrin	UJ	L
AT-Q-21-WS-8	Endrin	R	L
AT-Q-21-WS-8-D	Dieldrin	UJ	L
AT-Q-21-WS-8-D	Endrin	R	L
SA-S-2-SB-4	Dieldrin	UJ	L
SA-S-2-SB-4	Endrin	R	L
SA-S-1-WS-9	Dieldrin	UJ	L
SA-S-1-WS-9	Endrin	R	L
AT-Q-32-SB-6	Dieldrin	UJ	L
AT-Q-32-SB-6	Endrin	R	L

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?	x		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples AT-Q-21-WS-8-D and AT-P-4-SB-4-D were submitted as the duplicate samples for AT-Q-21-WS-8 and AT-P-4-SB.

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	9			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	24			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**87.3**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/6/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 027
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on LCS recoveries.

Field IDs:	AT-Q-21-WS-8	AT-Q-21-WS-8-D	SA-S-2-SB-4
	SA-S-1-WS-9	AT-Q-33-SB-5	AT-Q-35-WS-8
	AT-Q-32-SB-6	AT-P-4-SB-4	AT-P-4-SB-4-D

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?						x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10%			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code Ee - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries outside QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS Recovery	LCS Limits
LCS 680-12942	Pentachlorophenol	319 / 98	46-144

Field ID	Analyte	Qualification	Code
AT-Q-21-WS-8	Pentachlorophenol	J	L
AT-Q-21-WS-8-D	Pentachlorophenol	J	L
SA-S-1-WS-9	Pentachlorophenol	J	L
AT-Q-33-SB-5	Pentachlorophenol	J	L
AT-Q-35-WS-8	Pentachlorophenol	J	L
AT-P-4-SB-4	Pentachlorophenol	J	L

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples AT-Q-21-WS-8-D and AT-P-4-SB-4-D were submitted as duplicate samples for AT-Q-21-WS-8 and AT-P-4-SB-4.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	9			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Bradenburg	**Project Name:**	Sauget - Area 2
Date:	10/6/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 027
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification

Field IDs:

AT-Q-21-WS-8	AT-Q-21-WS-8-D	SA-S-2-SB-4
SA-S-1-WS-9	AT-Q-33-SB-5	AT-Q-35-WS-8
AT-Q-32-SB-6	AT-P-4-SB-4	AT-P-4-SB-4-D

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x										x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{o}C \pm 2\ ^{o}C$)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the method blank had detections above the MDL.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).	x									x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: All RPDs were within criteria, sample AT-Q-35-WS-8 was used as the duplicate sample.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.		x									x	
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet. Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.			x									x
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)			x									x
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note:

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Samples AT-Q-35-WS-8, SA-S-2-SB-4, AT-Q-SB-5, and AT-Q-32-SB-6 were diluted and analyzed, all recoveries were within QC limits.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)	x									x		

Note: Samples AT-Q-21-WS-8-D and AT-P-4-SB-4-D were submitted as the duplicate samples for AT-Q-21-WS-8 and AT-P-4-SB-4.

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	9		0		0		9
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		####		####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/6/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 027
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:	AT-Q-21-WS-8	AT-Q-21-WS-8-D	SA-S-2-SB-4
	SA-S-1-WS-9	AT-Q-33-SB-5	AT-Q-35-WS-8
	AT-Q-32-SB-6	AT-P-4-SB-4	AT-P-4-SB-4-D

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?	x		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples AT-Q-21-WS-8-D and AT-P-4-SB-4-D were analyzed in duplicate for samples AT-Q-21-WS-8 and AT-P-4-SB-4.

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		x	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	9			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/12/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 028
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on method blank contamination.

Field IDs:

SOIL-O-5-SB-5.5	AT-P-2-WS-10	SOIL-O-9
SOIL-O-10	SOIL-O-8	IDW-SITES
IDW-AT-Q-32		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the method blank had detections above the MDL.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?				x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 $^{o}C \pm 2\ ^{o}C$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	x		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: The method blank had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
SOIL-O-5-SB-5.5	Methylene chloride	U	-	Z
AT-P-2-WS-10	Methylene chloride	U	-	Z
SOIL-O-9	Methylene chloride	U	-	Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?			x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?					x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.					
		> UCL	10% to LCL	< 10%		
	Positive	J	J	J		
	Non-detect	None	UJ	R		

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	7			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/12/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 028
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on MS/MSD and LCS recoveries.

Field IDs:

SOIL-O-5-SB-5.5	AT-P-2-WS-10	SOIL-O-9
SOIL-O-10	SOIL-O-8	IDW-SITES
IDW-AT-Q-32		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the MS/MSD and the LCS had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?	x		
7.3	Are more than one of either fraction outside the acceptance criteria?		x	
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?			x
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD sample AT-P-2-WS-10 had 64 out of 65 analyte recoveries below the QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
AT-P-2-WS-10	All SVOCs	J/UJ	M

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note: The LCS sample LCS 680-13324 had 60 out of 65 analyte recoveries below QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
SOIL-O-5-SB-5.5	All SVOCs	J/UJ	L
SOIL-O-5-SB-5.5DL	All SVOCs	J/UJ	L
AT-P-2-WS-10	All SVOCs*	J/UJ	L
AT-P-2-WS-10DL	All SVOCs	J/UJ	L

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	7			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/12/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 028
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No qualifications were required in this SDG.

Field IDs:

SOIL-O-5-SB-5.5	AT-P-2-WS-10	SOIL-O-9
SOIL-O-10	SOIL-O-8	IDW-SITES
AIDW-AT-Q-32		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?						x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries			

Note: Sample AT-P-2-WS-10 was analyzed as the MS/MSD for PCBs.

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		x	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	7			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/12/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 028
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on surrogate and LCS recoveries.

Field IDs:

Soil-O-5-SB-5.5	AT-P-2-WS-10	SOIL-O-9
SOIL-O-10	SOIL-O-8	IDW-SITES
IDW-AT-Q-32		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS and surrogates had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?					x	
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?					x	
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x	
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note: Surrogate recoveries were outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SOIL-O-10	DCAA	13	35-134
IDW-SITES	DCAA	10	35-134

Field ID	Analyte	Qualification	Code
SOIL-O-10	All Herbicides	J/UJ	S
IDW-SITES	All Herbicides	J/UJ	S

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries outside QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS Recovery	LCS Limits
LCS 680-12942	Pentachlorophenol	293 / 92	46-144

Field ID	Analyte	Qualification	Code
SOIL-O-9	Pentachlorophenol	J	L

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		x	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	7			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/12/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 028
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on method blank contamination and MS/MSD recoveries.

Field IDs:

SOIL-O-5-SB-5.5	AT-P-2-WS-10	SOIL-O-9
SOIL-O-10	SOIL-O-8	IDW-SITES
IDW-AT-Q-32		

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x										x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C ± 2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.
The narrative also indicated that the method blank had detections above the MDL.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
Soil-O-5-SB-5.5	Chromium	U	-	P
AT-P-2-WS-10	Chromium	U	-	P
AT-P-2-WS-10	Copper	U	-	P
AT-P-2-WS-10	Selenium	U	-	P
SOIL-O-9	Aluminum	U	-	P
SOIL-O-9	Chromium	U	-	P
SOIL-O-9	Selenium	U	-	P
SOIL-O-10	Aluminum	U	-	P
SOIL-O-10	Selenium	U	-	P
SOIL-O-8	Aluminum	U	-	P
SOIL-O-8	Copper	U	-	P
SOIL-O-8	Selenium	U	-	P
IDW-SITES	Copper	U	-	P
IDW-SITES	Selenium	U	-	P
IDW-AT-Q-32	Aluminum	U	-	P
IDW-AT-Q-32	Chromium	U	-	P
IDW-AT-Q-32	Selenium	U	-	P

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ±2 X PQL for solids) Action: If no, J(+).	x									x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: All RPDs were within criteria, sample AT-P-2-WS-10 was used as the duplicate sample.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)		x									x	
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: Sample AT-P-2-WS-10 was spiked and analyzed, recoveries were outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD recoveries	MS/MSD Limits
AT-P-2-WS-10	Cadmium	128 / 48	75-125
AT-P-2-WS-10	Lead	138 / 97	75-125
AT-P-2-WS-10	Nickel	72 / 70	75-125

Field ID	Analyte	Qualification	Code
AT-P-2-WS-10	Cadmium	J	M
AT-P-2-WS-10	Lead	J	M
AT-P-2-WS-10	Nickel	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Samples AT-P-2-WS-10, SOIL-O-9, and IDW-AT-Q-32 were diluted and analyzed, all %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		x									x	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)			x									x

Note:

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	7		0		0		7
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		**####**		**####**		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/12/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 028
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:

Soil-O-5-SB-5.5	AT-P-2-WS-10	SOIL-O-9
SOIL-O-10	SOIL-O-8	IDW-SITES
IDW-AT-Q-32		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		x	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	7			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/12/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 029
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No analytes required qualification, based on this data review.

Field IDs: AT-P-5-WS-12 AT-P-3-WS-10

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: No anomalies were noted in the case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?				x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 $^{o}C \pm 2\ ^{o}C$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			

	> UCL	10% to LCL	< 10%			
Positive	J	J	J			
Non-detect	None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%		Area < -50%	Area < -10%			
	Positive	J		J	J			
	Non-detect	None		UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	10			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/12/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 029
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG

Field IDs: AT-P-5-WS-12 AT-P-3-WS-10

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?	x		
7.3	Are more than one of either fraction outside the acceptance criteria?		x	
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?			x
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	2			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/12/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 029
		Review Level:	Level III

Major Anomalies:

Samples were rejected based on LCS recoveries.

Minor Anomalies:

Samples were qualified based on LCS recoveries.

Field IDs: AT-P-5-WS-12 AT-P-3-WS-10

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that LCS recoveries were outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?						x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries outside the QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS Recovery	LCS Limits
LCS 680-14568	Dieldrin	20	38-136
LCS 680-14568	Endrin	0	34-146

Field ID	Analyte	Qualification	Code
AT-P-5-WS-12	Dieldrin	UJ	L
AT-P-5-WS-12	Endrin	R	L
AT-P-3-WS-10	Dieldrin	UJ	L
AT-P-3-WS-10	Endrin	R	L

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		x	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	2			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	2			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**95.2**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/12/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 029
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs: AT-P-5-WS-12 AT-P-3-WS-10

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 OC), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?						x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		x	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	2			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/12/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 029
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on method blank contamination.

Field IDs: AT-P-5-WS-12 AT-P-3-WS-10

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x										x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C $\pm$ 2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the method blank had detections above the MDL.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
AT-P-5-WS-12	Aluminum	U	-	P
AT-P-3-WS-10	Aluminum	U	0.27	P
AT-P-3-WS-10	Chromium	U	-	P

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)												
	< -IDL > IDL < 50% 50% - 79% > 120%												
	UJ(-) J(+) R(+/-) J(+)/UJ(-) J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid Aqueous												
	< LCL > UCL < 50% 50% - 79% > 120%												
	J(+)/UJ(-) J(+) R(+/-) J(+)/UJ(-) J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.		x									x	
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x									x
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).			x									x
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note:

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)	x									x		
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note:

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Sample AT-P-5-WS-12 was diluted and analyzed.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		x									x	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)			x									x

Note:

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	2		0		0		2
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		#####		#####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	10/12/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 029
Test Name:	Ammonia	**Review Level:**	Level III
Method No.:	350.1		

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs: AT-P-5-WS-12 AT-P-3-WS-10

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code R - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code f)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		x	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	2			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/15/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 030
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No analytes required qualification, based on this data review.

Field IDs:	SA-0-1	TB-28	SA-0-02
	TB-29	GM-19A	GM-19A-D
	SA-0-3	SA-0-3-D	TB-30
	GM-19C	SA-Q-5	SA-Q-7
	SA-Q-8	TB-31	SA-Q-4
	SA-Q-6	TB-32	SA-Q-3
	SA-Q-2		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note: No anomalies were noted in the case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	

Matrix	Preserved	Aromatic	All others			
Aqueous	No	7 days	14 days			
	Yes	14 days	14 days			
Soil/Sediment	4 $^{o}C \pm 2\ ^{o}C$	14 days	14 days			

2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	x		
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory flagged) concentrations.	"J"		
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: Several of the trip blanks had methylene chloride detections above the MDL. All associated samples were non-detect for methylene chloride. No qualifications of data were required.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			
	> UCL / 10% to LCL / < 10%			
	Positive: J / J / J			
	Non-detect: None / UJ / R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples GM-19A and SA-0-3 were the parent samples for GM-19A-D and SA-0-3-D respectively.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	19			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/16/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 030
		Review Level:	Level III

No samples were rejected

Minor Anomalies:

Samples were qualified due to LCS, surrogate, and internal standard recoveries. Also due to method blank contamination and holding time criteria.

Field IDs:

SA-0-1	SA-0-02	GM-19A
GM-19A-D	SA-0-3	SA-0-3-D
GM-19C	SA-Q-5	SA-Q-7
SA-Q-8	SA-Q-4	SA-Q-6
SA-Q-3	SA-Q-2	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: One sample had to be reanalyzed outside of holding time.
The method blank had detections above the MDL.
The surrogates, LCS, and internal standards had recoveries outside QC limits

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: One sample was re-extracted 6 days outside of holding time. Qualifications are listed below.

Field ID	Analyte	Qualification	Days late	Code
SA-Q-4RE	All SVOCs	J/UJ	6	H

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The method blank had detections above the MDL.

Field ID	Analyte	Qualification	Code
SA-Q-4RE	Diethyl phthalate	U	Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?		x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: One sample and its reanalyses had surrogate recoveries below QC limits. Qualifications are listed below.

Field ID	Analytes	Qualification	Code
SA-Q-4	All SVOCs	J/UJ	S
SA-Q-4RE	All SVOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection.			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note: The LCS had one analyte outside QC limits. Qualifications are listed below.

LCS ID	Analytes	LCS Recovery	LCS Limits
680-16343	4-Chloroaniline	10	22-107

Field ID	Analytes	Qualification	Code
SA-0-1	4-Chloroaniline	UJ	L
SA-0-2	4-Chloroaniline	UJ	L
GM-19A	4-Chloroaniline	J	L
GM-19A-D	4-Chloroaniline	J	L
SA-0-3	4-Chloroaniline	J	L
SA-0-3-D	4-Chloroaniline	J	L
GM-19C	4-Chloroaniline	J	L
SA-Q-5	4-Chloroaniline	UJ	L
SA-Q-7	4-Chloroaniline	UJ	L
SA-Q-8	4-Chloroaniline	UJ	L
SA-Q-4	4-Chloroaniline	J	L
SA-Q-6	4-Chloroaniline	J	L
SA-Q-3	4-Chloroaniline	J	L
SA-Q-2	4-Chloroaniline	UJ	L

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?					x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note: Several samples had internal standards below QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
GM-19C	All SVOCs	J/UJ	I
SA-Q-6	All SVOCs	J/UJ	I
SA-Q-3	All SVOCs	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples GM-19A and SA-0-3 were submitted as the parent samples for GM-19A-D and SA-0-3-D.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	14			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/15/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 030
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on surrogate recoveries.

Field IDs:			
	SA-0-1	SA-0-02	GM-19A
	GM-19A-D	SA-0-3	SA-0-3-D
	GM-19C	SA-Q-5	SA-Q-7
	SA-Q-8	SA-Q-4	SA-Q-6
	SA-Q-3	SA-Q-2	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the surrogate and LCS recoveries were outside QC limits

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Several samples had surrogates recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-0-02	DCB Decachlorobiphenyl	16	30-150
GM-19C	DCB Decachlorobiphenyl	24	30-150
SA-Q-5	DCB Decachlorobiphenyl	22	30-150
SA-Q-8	DCB Decachlorobiphenyl	9	30-150
SA-Q-4	DCB Decachlorobiphenyl	28	30-150
SA-Q-6	DCB Decachlorobiphenyl	19	30-150
SA-Q-3	DCB Decachlorobiphenyl	6	30-150
SA-Q-2	DCB Decachlorobiphenyl	15	30-150

Field ID	Analytes	Qualification	Code
SA-0-02	All Pesticides	J/UJ	S
GM-19C	All Pesticides	J/UJ	S
SA-Q-5	All Pesticides	J/UJ	S
SA-Q-8	All Pesticides	J/R	S
SA-Q-4	All Pesticides	J/UJ	S
SA-Q-6	All Pesticides	J/UJ	S
SA-Q-3	All Pesticides	J/R	S
SA-Q-2	All Pesticides	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries above the QC limits creating a high bias. All associated data were reported non-detect; therefore, no qualifications were required.

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?	x		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples GM-19A and SA-0-3 were the parent samples for GM-19A-D and SA-0-3-D.

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	14			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	42			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**85.7**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/16/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 030
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs:	SA-0-1	SA-0-2	GM-19A
	GM-19A-D	SA-0-3	SA-0-3-D
	GM-19C	SA-Q-5	SA-Q-7
	SA-Q-8	SA-Q-4	SA-Q-6
	SA-Q-3	SA-Q-2	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note: The laboratory case narrative indicated no problems.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?						x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples GM-19A and SA-0-3 were submitted as the parent samples for GM-19A-D and SA-0-3-D.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	14			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review
Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/16/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 030
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on blank contamination and MS/MSD recoveries.

Field IDs:

SA-0-1	SA-0-2	GM-19A
GM-19A-D	SA-0-3	SA-0-3-D
GM-19C	SA-Q-5	SA-Q-7
SA-Q-8	SA-Q-4	SA-Q-6
SA-Q-3	SA-Q-2	

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x										x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C + 2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.
The narrative also indicated that the method blank had detections above the MDL.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code C)

					ICP			ICP-MS			GFAA			CVAA-Hg		
					Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)						x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).															x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.						x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.						x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).						x									x
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)											
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%											
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%											

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
SA-0-1	Cobalt	U	-	P
GM-19A	Chromium	U	-	P
GM-19A-D	Chromium	U	-	P
SA-0-3	Chromium	U	-	P
SA-0-3-D	Chromium	U	-	P
GM-19C	Chromium	U	-	P
SA-Q-7	Chromium	U	-	P
SA-Q-4	Chromium	U	-	P
SA-Q-6	Chromium	U	-	P
SA-Q-2	Chromium	U	-	P

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ±2 X PQL for solids) Action: If no, J(+).	x									x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: All RPDs were within criteria, samples SA-0-1, GM-19A, and SA-Q-2 were used as the duplicate sample.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)		x								x		
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: Sample SA-0-1 was spiked and analyzed, with recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recovery	MS/MSD limits
SA-0-1	Manganese	116 / 128	75-125
SA-0-1	Sodium	125 / 133	75-125

Field ID	Analyte	Qualification	Code
SA-0-1	Manganese	J	M
SA-0-1	Sodium	J	M

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											
Note:	Samples SA-0-1, GM-19A, and SA-Q-2 were diluted and analyzed, all %Ds were within QC limits.												

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)	x									x		

Note: Sample GM-19A and SA-0-3 were submitted as the parent samples for GM-19A-D and SA-0-3-D

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)									
13.2	Number of samples:	14		0		0		14		
13.3	Number of target compounds in each analysis:	22		0		0		1		
13.4	Number of results rejected and not reported:	0		0		0		0		
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)									
	% Completeness	**100**		####		####		**100**		

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	7/11/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 030
Test Name:	Ammonia, Chloride, Nitrogen, Sulfate, TOC, dissolved gases	**Review Level:**	Level III
Method No.:	350.1, 325.2, 353.2, 375.4, 415.1, RSK-175		

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries.

Field IDs:

SA-0-1	SA-0-2	GM-19A
GM-19A-D	SA-0-3	SA-0-3-D
GM-19C	SA-Q-5	SA-Q-7
SA-Q-8	SA-Q-4	SA-Q-6
SA-Q-3	SA-Q-2	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The narrative indicated that the MS/MSD recoveries for ammonia were outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The ammonia MS/MSD sample had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
SA-0-1	Ammonia	78 / 79	90-110

Field ID	Analyte	Qualification	Code
SA-0-1	Ammonia	J	M

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?	X		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples GM-19A and SA-0-3 were submitted as the parent samples for GM-19A-D and SA-0-3-D.

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	X		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		X	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	X		

Note: Samples SA-Q-8, GM-19C, SA-Q-4, SA-0-02, and GM-19A were analyzed in duplicate.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		X		
12.2	Number of samples:	6			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/19/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 031
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on trip blank contamination.

Field IDs:

SA-Q-1	SA-Q-10	SA-Q-13
SA-Q-9	SA-Q-11	SA-Q-16
SA-Q-14	GM-4-A	GM-4B
SA-Q-15	GM-17C	TB-33
GM-3	MW-3C	GM-7
MW-7C	MW-7B	TB-34

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: No anomalies were noted in the case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix / Preserved / Aromatic / All others			
	Aqueous / No / 7 days / 14 days			
	Yes / 14 days / 14 days			
	Soil/Sediment / $4\ ^{O}C \pm 2\ ^{O}C$ / 14 days / 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	x		
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: The two trip blanks submitted had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
SA-Q-9	Dibromochloromethane	U	-	Y
SA-Q-9	Bromoform	U	-	Y
GM-4A	Bromoform	U	-	Y

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			
	> UCL / 10% to LCL / < 10%			
	Positive: J / J / J			
	Non-detect: None / UJ / R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample MW-3C was spiked and analyzed as the MS/MSD.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	18			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/19/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 031
		Review Level:	Level III

Major Anomalies:

Samples were rejected based on holding times

Minor Anomalies:

Samples were qualified based on surrogate recoveries.

Field IDs:

SA-Q-1	SA-Q-10	SA-Q-13
SA-Q-9	SA-Q-11	SA-Q-16
SA-Q-14	GM-4A	GM-4B
SA-Q-15	GM-17C	GM-3
MW-3C	GM-7	MW-7C
MW-7B		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: Samples were reanalyzed outside of holding time.

The MS/MSD and surrogates had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: Samples had to be reanalyzed outside of holding time due to surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Days late	Code
SA-Q-1RE	All SVOCs	R	29	H
SA-Q-1REDL	All SVOCs	R	29	H
SA-Q-15RE	All SVOCs	R	29	H
MW-7BRE	All SVOCs	R	29	H

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?		x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Several samples had surrogate recoveries below QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
SA-Q-1	All acid fraction SVOCs	J/UJ	S
SA-Q-15	All acid fraction SVOCs	J/UJ	S
MW-7B	All SVOCs	J/R	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Several analytes were outside QC limits for the MS/MSD sample MW-3C; however, the LCS recoveries were within QC limits. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?				x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?				x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.						

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	16			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/19/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 031
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on surrogate recoveries.

Field IDs:	SA-Q-1	SA-Q-10	SA-Q-13
	SA-Q-9	SA-Q-11	SA-Q-16
	SA-Q-14	SA-Q-15	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS and surrogate recoveries were outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Surrogate recoveries for two pesticide samples were outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-Q-1	DCB Decachlorobiphenyl	9	30-150
SA-Q-14	DCB Decachlorobiphenyl	11	30-150

Field ID	Analyte	Qualification	Code
SA-Q-1	All Pesticides	J/R	S
SA-Q-14	All Pesticides	J//UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix.* Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries above QC limits. All associated data was reported as non-detect. No qualification of data was required.

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		x	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	8			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/19/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 031
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs:

SA-Q-1	SA-Q-10	SA-Q-13
SA-Q-9	SA-Q-11	SA-Q-16
SA-Q-14	GM-4A	GM-4B
SA-Q-15	GM-17C	GM-3
MW-3C	GM-7	MW-7C
MW-7B		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

				Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?			x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?					x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					
		> UCL	10% to LCL	< 10%		
	Positive	J	J	J		
	Non-detect	None	UJ	R		

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample MW-3C was analyzed as the MS/MSD.

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		x	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	6			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/19/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 031
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification

Field IDs:

SA-Q-1	SA-Q-10	SA-Q-13
SA-Q-9	SA-Q-11	SA-Q-16
SA-Q-14	GM-4A	GM-4B
SA-Q-15	GM-17C	GM-3
MW-3C	GM-7	MW-7C
MW-7B		

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x										x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C $\pm$ 2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the method blank had detections above the MDL.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: One target analyte was detected above the IDL; however, the associated sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes				Spiked analytes (ICS AB analytes)								
	< -IDL	> IDL		< 50%	50% - 79%	> 120%							
	UJ(-)	J(+)		R(+/-)	J(+)/UJ(-)	J(+)							

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	X									X		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		X									X	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	X									X		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		X									X	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids) Action: If no, J(+).	X									X		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: All RPDs were within criteria, sample MW-3C was used as the duplicate sample.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)	x									x		
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: Sample MW-3C was spiked and analyzed, all recoveries were within QC limits.

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Samples MW-3C and SA-Q-13 were diluted and analyzed, all %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		x									x	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)			x									x

Note:

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)									
13.2	Number of samples:	16		0		0		16		
13.3	Number of target compounds in each analysis:	22		0		0		1		
13.4	Number of results rejected and not reported:	0		0		0		0		
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)									
	% Completeness	**100**		####		####		**100**		

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/19/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 031
Test Name:	Ammonia, Chloride, Nitrogen, Sulfate, TOC, dissolved gases	**Review Level:**	Level III
Method No.:	350.1, 325.2, 353.2, 375.4, 415.1, RSK-175		

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on MS/MDS recoveries.

Field IDs:

SA-Q-1	SA-Q-10	SA-Q-13
SA-Q-9	SA-Q-11	SA-Q-16
SA-Q-14	GM-4A	GM-4B
SAQ-15	GM-17C	GM-3
MW-3C	GM-7	MW-7C
MW-7B		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD sample MW-3C had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
MW-3C	Chloride	83 / 86	85-115
MW-3C	Ammonia	85 / 83	90-110

Field ID	Analyte	Qualification	Code
MW-3C	Chloride	J	M
MW-3C	Ammonia	J	M

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	x		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	x		

Note: Samples MW-3C, SA-Q-1, GM-17C, and MW-7B were analyzed as the laboratory duplicate samples.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	16			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/21/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 031
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on blank contamination.

Field IDs:	GM-5	MW-5C	MW-5B
	GM-18B	GM-18A	GM-18A-D
	TB-35	GM-6B	GM-17B
	TB-36	MW-3B	SA-P-2
	TB-37	GM-6A	SA-0-4

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: No anomalies were noted in the case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?				x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 $^{o}C \pm 2\ ^{o}C$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	x		
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The trip blank had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
GM-18A	Chlorobenzene	U	-	Y
GM-18A-D	Chlorobenzene	U	-	Y

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample GM-17B was analyzed as the MS/MSD.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		
	Area > +100% / Area < -50% / Area < -10%			
	Positive: J / J / J			
	Non-detect: None / UJ / R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample GM-18A-D was submitted as the duplicate sample for GM-18A

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	15			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/21/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 032
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on surrogate and internal standard recoveries.

Field IDs:	GM-5	MW-5C	MW-5B
	GM-18B	GM-18A	GM-18A-D
	GM-6B	GM-17B	MW-3B
	SA-P-2	GM-6A	SA-0-4

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The MS/MSD, surrogate, and internal standard had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?		x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Surrogate recoveries for one sample were outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
GM-18A	2FP, PHL, TBP	55 / 54 / 49	56-100 / 55-104 / 55-126

2FP = 2-Fluorophenol, PHL = Phenol-d5, TBP = 2,4,6-Tribromophenol

Field ID	Analyte	Qualification	Code
GM-18A	All acid fraction SVOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Several analytes were outside QC limits for the MS/MSD sample GM-17B, however the LCS was within QC limits. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note:

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?		x	
	Area > +100% / Area < -50% / Area < -10%			
	Positive: J / J / J			
	Non-detect: None / UJ / R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: One sample had internal standard recoveries below QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	IS High/Low	Code
SA-P-2	All SVOCs	J/UJ	Low	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample GM-18A-D was submitted as the duplicate sample for GM-18A

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	12			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
PESTICIDES/PCBs ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/21/2005	**Project Number:**	21561511.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 032
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on LCS recoveries.

Field IDs: SA-P-2
SA-0-4

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the LCS and surrogate recoveries were outside QC limits

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: One PCB sample had recoveries above QC limes. All analytes were reported at non-detect; therefore no qualification of data was required.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries outside the QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS recoveries	LCS Limits
LCS 680-17418	Endosulfan II	32	40-123

Field ID	Analyte	Qualification	Code
SA-P-2	Endosulfan II	UJ	L
SA-0-4	Endosulfan II	UJ	L

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		x	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
13.2	Number of samples:	2			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/21/2005	**Project Number:**	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 032
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified based on this SDG.

Field IDs:	GM-5	MW-5C	MW-5B
	GM-18B	GM-18A	GM-18A-D
	GM-6B	GM-17B	MW-3B
	SA-P-2	GM-6A	SA-0-4

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated the MS/MSD had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

				Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?			x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?			x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?					x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					
		> UCL	10% to LCL	< 10%		
	Positive	J	J	J		
	Non-detect	None	UJ	R		

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix* . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD sample GM-17B had recoveries outside QC limits. The LCS was within QC limits; therefore, no qualification of data was required.

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples GM-18A-D was submitted as the duplicate sample for GM-18A

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	12			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET - Level III Review
Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/21/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 032
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on method blank contamination.

Field IDs:

GM-5	MW-5C	MW-5B
GM-18B	GM-18A	GM-18A-D
GM-6B	GM-17B	MW-3B
SA-P-2	GM-6A	SA-0-4

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x										x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C ± 2 ^{o}C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that the method blank had detections above the MDL.

2.0 Holding Time (Code H)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).												

Note:

3.0 Instrument Calibration (Code C)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			x									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			x									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			x									x
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)												
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: One target analyte value was detected above the IDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
GM-5	Cobalt	U	-	P
GM-18A	Cobalt	U	-	P
GM-6B	Cobalt	U	-	P
MW-3B	Cobalt	U	-	P
SA-P-2	Cobalt	U	-	P
GM-6A	Cobalt	U	-	P
SA-0-4	Cobalt	U	-	P

5.0 ICP Interference Check Sample (ICS) (Code N)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			x									
5.2	Are the ICS AB recoveries within 80% - 120%?			x									
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x									
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x									
	Action: Not Spiked Analytes / Spiked analytes (ICS AB analytes)												
	< -IDL / > IDL / < 50% / 50% - 79% / > 120%												
	UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid / Aqueous												
	< LCL / > UCL / < 50% / 50% - 79% / > 120%												
	J(+)/UJ(-) / J(+) / R(+/-) / J(+)/UJ(-) / J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ±2 X PQL for solids) Action: If no, J(+).	x									x		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: All RPDs were within criteria, sample GM-17B was used as the duplicate sample.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)	x									x		
	%R > 125% 30% < %R < 74% %R < 30%												
	Positive J J J												
	Non-detect None UJ R												

Note: Sample GM-17B was spiked and analyzed, all recoveries were within QC limits.

9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			x									x

Note:

10.0 ICP Serial Dilutions (Code S)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Samples GM-17B and GM-18A were diluted and analyzed, all %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)	x									x		

Note: Sample GM-18A-D was submitted as the duplicate sample for GM-18A.

12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	12		0		0		12
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0		0		0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)							
	% Completeness	**100**		####		####		**100**

Note:

DATA VALIDATION WORKSHEET
WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	**Project Name:**	Sauget - Area 2
Date:	9/21/2005	**Project Number:**	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	**SDG No.:**	SAS 032
Test Name:	Ammonia, Chloride, Nitrogen, Sulfate, TOC, dissolved gases	**Review Level:**	Level III
Method No.:	350.1, 325.2, 353.2, 375.4, 415.1, RSK-175		

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:

GM-5	MW-5C	MW-5B
GM-18B	GM-18A	GM-18A-D
GM-6B	GM-17B	MW-3B
SA-P-2	GM-6A	SA-0-4

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: No anomalies were reported in the laboratory case narrative.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note: